DECEMBER 1991
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MacUser

PORTABLE POWER:

APPLE'S NEW POWERBOOKS

MacUSER LABS **Three notebook Macs that pack desktop power**

NEW!

Quadra

Classic II

An updated Classic and the fastest Macs ever!
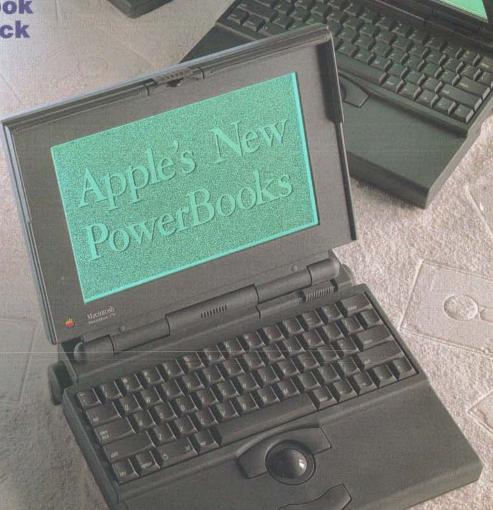
MacUSER LABS **COLOR SCANNERS: 24-bit input costs less than you think**

THE MACUSER 100: 100 terrific products that won't bust your budget
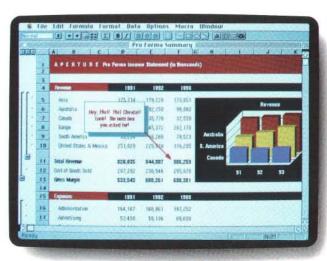
Apple's New PowerBooks

Macintosh PowerBook 170

We'd like
to respond
to your
suggestions
on how to
improve
Microsoft
Excel.

MacUser

DECEMBER 1991

Volume 7 Number 12
Cover photo by Walt Denson
Inset photo by Steven Underwood

Sections

Reviews

"IBM is looking out for IBM; Apple is looking out for Apple. Sometimes our goals might overlap; sometimes they won't. At all times, we are responsible for our own fate." **30**

SCANNED ON THE ABATON SCAN 300/COLOR

Proof that Abaton's color scanner can make anything look attractive.

See for yourself. Everything looks better with Abaton's 24-bit Scan 300/Color scanner. Just ask Slash.

Scanning colorful figures like Slash brings your monitor to life. You can size color pictures and see their relationship to other text and graphics — right on the screen. More than that, you can produce a variety of colorful images. Like stunning comps and presentations from a 300-dpi color printer. Or how about impressive 35mm or overhead slide shows with actual color photos. Even high quality proofs of four-color film for a national ad. Not to mention black-and-white art and photos, which look great with the Scan 300/Color's gray scale, halftone, and line art scanning modes.

And that's not all. We include Adobe Photoshop so you can enhance your original photo and make it more alluring. This powerful image editing software lets you change a natural blond to fuchsia. You can also remove unsightly blemishes from a picture entirely — or make just about any modification you can imagine.
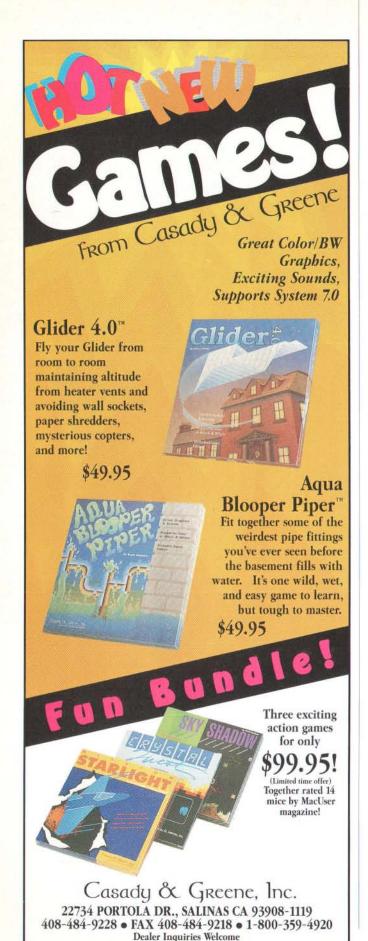
With the Scan 300/Color, everything from your monitor to finished results will look marvelous. Even the price of $1,995* is rather attractive. So if you want to look as good as Slash, call Abaton at *1-800-444-5321 or (415) 683-2226* for the dealer nearest you.

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CIRCLE 153 ON READER SERVICE CARD.

MacUser

List Watch

Here's a list of ten things you should know about this month's issue. Starting with . . . a list.

1. "The *MacUser* 100," a compendium of cool products that cost less than $250, makes its third annual appearance. If you can't find at least one nifty item that you didn't realize you needed until you read about it here, we'll eat our Wacky Vac.

2. Apple's three new PowerBooks, which are featured on our cover this month, are not included in "The *MacUser* 100," but *only* because they cost substantially more than our self-imposed price limit (starting at about $2,045 more, in fact). One place you *will* find the Power-Books is on the personal wish list of every editor who's had the opportunity to try them.

3. At up to $250 per product, "The *Mac-User* 100" tab could theoretically have reached $25,000. In reality, if you bought one of everything on the list (be sure to pay those

Associate editor Victoria von Biel, who labored long and hard on "The *MacUser* 100," may need a PowerBook any day now.

shareware fees!), you'd be out only $7,367.33.

4. That's still $2,768.33 more than a top-of-the-line PowerBook 170 will set you back. The 6.8-pound 170 is comparable to a Mac IIci in overall performance, and its active-matrix screen is the finest display available on any notebook computer anywhere. All that for just $676.32 per pound. The about-to-be-history Macintosh Portable (which first shipped in 1989), in comparison, could be had for a mere $175.79 per pound at this writing. Saffron, a yellow spice that Spaniards use to make paella, costs about $1,320.80 per pound. Hey, everything's relative.

5. Victoria von Biel, the *MacUser* associate editor who was primarily responsible for the compilation and writing of "The *MacUser* 100," will soon be taking a leave of absence to see to the delivery of an even more important package. We expect that it will weigh more than a PowerBook but less than a Portable.

6. People such as Vicky who might want to work at home for a while should check out "AppleTalk Remote Access," in this month's Bridges section. At $199 for three users, setting up the *MacUser* edit and labs staff would cost about $2,223. Setting up mainland China would cost about $74,266,800,000. Of course, someone would have to buy them Macs.

7. *Lots* of Macs.

8. Apple has been busy compiling some lengthy lists of its own. The current crop of new hardware and software products is the biggest ever. Approximately two dozen Apple products made their debut in October '91.

9. After you've read our editors' "Desert-Island Diskettes" lists, send us your own. Pick ten Mac products that you'd take to a desert island. If we publish your list, we'll send you a *MacUser* T-shirt, worth much less than $250.

10. The Mac Quadras are pretty cool too. ▨

ANTICIPATION.
THE LAST THING YOU WANT IN A MAC.

For those of you who have been waiting for fast, reliable accelerator cards at affordable prices, the wait is over.

With 12 years experience accelerating Apple products, Applied Engineering now introduces the TransWarp line of Macintosh accelerators. At prices that will quicken your pulse.

Our accelerators boost the Macintosh SE, SE/30, LC, IIsi and IIci to unrivaled levels of performance. We've designed around Motorola 68030 and 68040 processors to combine speed and guaranteed compatibility with all Macintosh hardware and software, including System 7 and A/UX. And at

With our super fast accelerator cards, like the TransWarp 040, your Mac will never keep you waiting again.

clock speeds from 25 to 50 MHz, your Mac won't get caught in the processing bottleneck. We back our products with a 30-day money back guarantee*, full one-year warranty and free 24-hour bulletin board support.
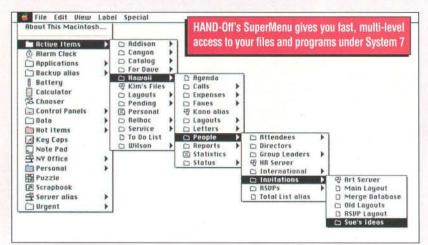
For fast, reliable accelerator cards at affordable prices, don't wait. Visit an authorized Applied Engineering Dealer today (over 2000 nationwide) or call toll-free for a complete product catalog. And start anticipating life in the fast lane.

*Through participating dealers.

ÆE APPLIED ENGINEERING
The Apple Enhancement Experts
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CIRCLE 70 ON READER SERVICE CARD.

For fast, easy file access, get new HAND-Off II

HAND-Off's SuperMenu gives you fast, multi-level access to your files and programs under System 7

Moving through a clutter of overlapping windows can be confusing. Your desktop will be easier to use when you pair HAND-Off II's new Autohide feature with System 7.0. Autohide lets you automatically hide all windows except the ones that your current application is using. The result is a cleaner, more productive desktop.

Automatic substitution for your missing applications

Say goodbye forever to the annoying "Application Not Found" message. If the program you need is missing, HAND-Off II's application substitution will automatically use an alternate.

Now, whenever you click on a file, you can automatically open a compatible alternate application.

The file "Year End Summary" could not be opened/printed (the application is busy or missing).

OK

With HAND-Off II's "on-the-fly" application substitition this error message is obsolete.

G et more done in less time with HAND-Off,™ the collection of productivity tools that make accessing files a snap. As MacWEEK said, "It's so good that Apple should have put it in their system software."

Here's how the new System 7.0 savvy version can make your Macintosh even more productive.

Locate and launch files fast using the Apple menu

Click open any document, alias or application directly from the Apple menu. Speed through your control panels with a mouse stroke. HAND-Off II's new

SuperMenu™ turns the System 7.0 Apple menu into a multi-level hierarchy for viewing, launching and opening both folders and files.

Pop-up menus open many files simultaneously

Organize files and applications the way you work. With the HAND-Off II pop-up launch menu you can easily open any file or group of files. This custom pop-up menu is ideal for opening all of the letters, charts, spreadsheets and files associated with a project.

Finder enhancements for increased productivity

You can create custom settings for any application, so whatever is running, your Mac will automatically switch to the environment you prefer. HAND-Off II lets you individually set the color depth and sound level for any application. It's all automatic.

Run your Mac in full color when you use your favorite graphics programs. Then HAND-Off II will transparently change to the faster black and white mode when you switch to a word processing or spreadsheet program.

You can even pre-assign application substitutions. HAND-Off II lets you double click on any file–even one from a DOS machine–and automatically open it using a compatible alternate program.

Get HAND-Off II, the productivity tool that MacUser rates five mice. Call your software supplier or Connectix direct at (800) 950-5880 or (415) 324-0727.

"This utility is definitely in a league with Suitcase II – and it's indispensible."
– MacUser, February 1991

800-950-5880

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C O R P O R A T I O N

LETTERS

Font of Knowledge

Congratulations to Kathleen Tinkel on her article "Dueling Font Standards," in the October '91 issue (page 165). I consider myself a fairly advanced user of the Mac, and I have spent inordinate amounts of time reading about fonts over a period of several years. I have never felt as comfortable with the subject as I do after reading Kathleen's article. I think that for the first time, someone stated the details of how and why instead of simply stating what is so.

Bob Perdriau
Los Altos, CA

From Marriage to Mecca

My life is not as a wife, and neither is my wife's, but after reading Guy Kawasaki's October '91 column ("My Life As a Wife," page 29), I felt the need to send my approval of *MacUser*'s publishing practices. As an engineer in Silicon Valley, I find Guy Kawasaki's attitude and demeanor a great relief in the place I once felt was Mecca.

Robert M. Griswold, Jr.
Fremont, CA

Little Shopping Horrors

To counter Jon Zilber's ideas on superstores ("One for the Dealer," September '91, page 25), I don't think they can sell Macs. Picture this:

Joe Shopper is pounding the pavement in a superstore, feeling smugly superior to the schmucks who shop where there's carpet on the floor. He sees a Mac LC perched on a stack of boxes. Next to it is an IBM PS/1, priced at maybe $400 less. Both have color monitors; both have hard drives; both are running flashy-looking demo programs. But, hey, the PS/1 includes a modem and Microsoft Works. IBM is hardly some no-name brand. "Boy, those Mac buyers must be suckers!" he thinks as he lugs a PS/1 box toward the register.

Jim Williams
Omaha, NE

When it comes to getting service, Apple dealers are almost as helpful as camera salespeople at K mart.

When I want information, I consult *MacUser*. When I want to buy, I buy mail order. The mail-order houses know more, and nothing beats the convenience of buying from your own desk. Superstores? Forget it. Why pay even a marginal markup for a kid with his thumb in his ear to say, "Looks great, huh?"

Ken Trammel
St. Louis, MO

If I have a choice of buying an Apple peripheral at a dealer or an off-brand by mail order, I'll take the mail order every time. My experiences with Apple dealers have been uniformly awful. The level of rudeness and ignorance on the part of the salespeople is staggering.

What a shame that the same company that

Dear Mr. Sculley . . .

Good old John C. Dvorak says that the Mac has a "rigid" interface, not an intuitive one. Instead of symbols such as garbage cans and mice, isn't there something as simple as throwing stones and smearing mud? (See John C. Dvorak's column in this issue.)

Speak Up:
What would make the Macintosh interface more intuitive?

✉ *Send your thoughts to Dear Mr. Sculley, c/o* MacUser, *950 Tower Lane, 18th Floor, Foster City, CA 94404.*

In September, we asked about your preferred source for buying Macintosh products. With one eye on his budget and the other on the dealer, Peter P. Beach, of Newburyport, Massachusetts, chose "Mail order, pure and simple. Why? Price, price, price. Also, I can call up any one of a handful of proven companies at 3:00 in the afternoon and the product's at my door by 9:05 the next morning. Best of all is never having to deal with those

twentysomething white-shirt, tie, and Supercuts morons at the local Apple dealer!"

Lynn Ellsworth, of Albany, New York, found Apple dealerships that were "staffed with jerks." The solution? "The clerks in my local supermarket don't tell me how to cook, but they're very helpful in finding the items I want. If Apple can't find helpful dealers, it should look for some with staff people who are at least able to point to the right shelf."

But Jim Williams, of Omaha, Nebraska, doesn't feel the dealer ship has sunk. "My dealer offers a chance to try things exhaustively before I buy them, and the prices aren't that bad. My dealer has even been known to say, 'Yes, we have expensive utility *X*, but you can do the same thing with cool public-domain program *Y*. Here, I'll make you a copy.' I'm not about to give up all this for a toll-free number and a parcel-express service!"

As the bumper sticker says, when the going gets tough, the tough go shopping. And when the shopping gets tough, people who are looking for a good Mac dealership go to Omaha.

LETTERS

produces a stellar product gives authorized dealerships to such people.

Lynne Malchiodi
Coram, NY

Superstores, mail-order houses, and authorized dealers all have pros and cons. Whatever Apple's official line, what matters most to the company now is that its machines are selling — not who's selling them. See "Dear Mr. Sculley" in this Letters section for more on shopping sources. — JZ

What's INIT for Me?

I recently installed System 7 on my 2-megabyte Classic with 40-megabyte internal hard drive. Great! Fantastic! True-Type is wonderful! No more Font/DA Mover! There's just one small problem — my Classic is now about as fast as a Commodore 64. OK, OK, maybe I'm exaggerating a little, but even After Dark has slowed down. Everything moves in 1-second increments. If you could tell me where to get a TrueType INIT for System 6, my troubles would be over.

Rich Garceau
Snohomish, WA

Using TrueType fonts with System 6.0.5 or 6.0.7 isn't any easier than using the Adobe Type Manager INIT and PostScript Type 1 fonts — you still must install them with Font/DA Mover (version 4.1). If you already have TrueType fonts, however, the TrueType alternative may be cheaper, because the TrueType INIT is free and available from many user groups, dealers, and on-line services. — AA

Background Information

I'll switch to System 7 as soon as I get a bigger computer that supports all the new features (I've "only" got a Classic), when System 7 supports background printing on all Apple printers (I've got a StyleWriter, you see), and when peer pressure is too strong for me to avoid looking old-fashioned. Very little is actually new about System 7, and a couple of its features simply aren't available to me as a non-Mac II user.

Horst Prillinger
Vienna, Austria

We can't buy you a new machine or relieve the peer pressure, but there is a solution to your background-printing problems. As of August 6, 1991, with the update of the StyleWriter's printer-driver software, all Apple laser-quality printers support background printing. Only the ImageWriter does not. Some user groups

and on-line bulletin boards have the StyleWriter update, and you can get it from your dealer. — NP

Support Support

After all the brickbats Apple has taken over the years for its lack of customer support, don't you think it deserves a belated bouquet for the System 7 Upgrade Answerline, which offers free telephone support for 90 days?

In the first few days after I too hastily installed System 7, I must have called a dozen times with problems requiring as much as half an hour of step-by-step tutelage. The service I got could help restore polish to a somewhat clouded image.

David Parry
Los Angeles, CA

Apple's "bundled" support for System 7 comes in the form of a toll-free number, available only to registered users. Anyone else can call (900) 535-2775 and pay $2 a minute for support. The automated question-and-answer line for System 7 is available to anyone for the price of a toll call, (408) 257-7700. — JZ

Consumables Reports

Your market survey on low-cost personal printers ("High-Quality Low-Cost Personal Printers, September '91, page 150) indicated that laser printers have a lower per-page cost than inkjet printers. Although that is true as far as the cost of consumables is concerned, it ignores the cost of buying the printer.

Using the cost data contained in the article's tables, I repeated the analysis using both costs. The results showed that inkjet printers enjoy a cost advantage up to approximately 20,000 pages. For example, the GCC WriteMove is less expensive than the Apple LaserWriter LS for the first 11,000 pages and the GCC PLP II for the first 12,000 pages. With inkjet printers, if you go through, say, 2,000 pages each year, the payback period will be about ten years; 5,000 pages, four years.

Michael A. Nelson
St. Louis, MO

In your article "High-Quality Low-Cost Personal Printers," the author states that "inkjet cartridges are not reusable." Apparently the MacUser Labs staff hasn't been reading *MacUser*'s own advertisements. This letter was printed on an HP DeskWriter with a cartridge nearing the end of its first refill. For about $20, I received two JetFill-brand plastic syringes

filled with ink. True, the printer head will wear out eventually (JetFill claims it should survive at least five refills), but the savings should be significant.

James Young
Culver City, CA

You're right. Refill kits are also available from Graphic Utilities, in Waltham, Massachusetts ([800] 669-4723 or [617] 890-1818); American Inkjet, in Billerica, Massachusetts ([508] 667-0600); and Aspen Imaging, in Lafayette, Colorado ([800] 955-5555 or [303] 666-5750). You can reach JetFill in Austin, Texas, at (800) 749-2993 or (512) 469-5647.—NP

Bond . . . Laser Bond

The article "High-Quality Low-Cost Personal Printers" failed to provide any useful information on how to select paper. The closest it comes is "Textured paper lets the ink bleed into its fibers, causing blurry edges on text and images. Pages with heavy ink coverage can also curl slightly because of moisture. Special inkjet paper or high-quality bond paper can minimize such effects."

Fine, but when I go to buy paper, what do I ask for? What does it cost? Judging from the reactions I get when I ask at the local office-supply stores, I might as well be speaking Greek.

Daniel B. January
St. Charles, MO

You should find answers to most of your questions in our recent roundup of paper designed specifically for laser printers ("The Paper Trail," March '91, page 181).—AA

Of Mice and Money

Tom Wrona's five-mouse rating of Managing Your Money ("Your Money and Your Mac," September '91, page 96) strikes me as incredible. MYM is fundamentally flawed. The user can create budgets only for income and expense categories, not for cash transactions to or from assets and liabilities. As a result, you are caught in a dilemma. On the one hand, your budget can ignore the money that goes into investments, loan or mortgage principal, set-asides for future tax payments, and so on. But if these are nontrivial, cash projections will be way off. On the other hand, you can create fictitious budget categories for these outlays — only to find that actual-versus-budget comparisons are way off.

Hugh C. Lauer
Concord, MA

Tom Wrona ("Your Money and Your Mac") referred to WealthBuilder's financial advice as "downright wacky" for suggesting he put a small portion of his assets into equities and precious metals. Such a comment is simply incorrect.

What drives WealthBuilder are the theories of Harry Markowitz, who won the 1990 Nobel Peace Prize in Economics. Harry found that a mix of investment assets has been demonstrated over time to be the safest, most prudent way to protect investors while enabling their money to grow at a fast rate.

Also, WealthBuilder has a suggested retail price of $169.95, not $249.95 as was reported.

Mark H. Goldstein, President
Reality Technologies, Ltd.
Philadelphia, PA

Your article on financial management ("Your Money and Your Mac"), as fine as it was, contains an error. On page 100, you state that you cannot print tear-out checks from your checkbook on the HP Desk-Writer. This just isn't so. About two years ago, the Aatrix people and I figured out how to do it with CheckWriter. Just treat the check as an envelope, and hand-feed it through the DeskWriter's center rollers.

L. D. Shain
Summerland, CA
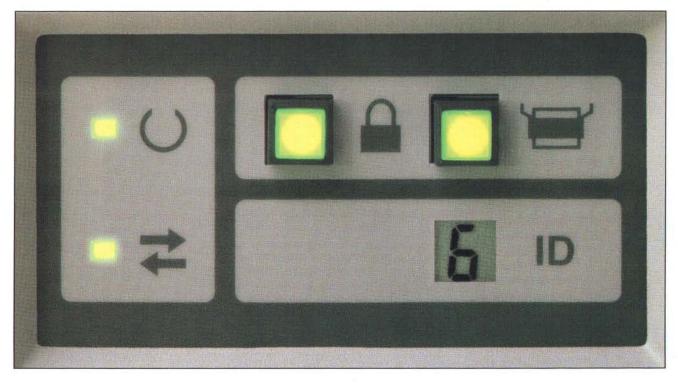
Your personal-finance article ("Your Money and Your Mac")was relatively fair to all the products concerned. However, I wish that several things about CheckWriter II had been pointed out. CheckWriter II has the ability to graph reports, a feature missing from Quicken. Second, although you brought up the cost of preprinted checks for the various programs, it would have been nice if you'd pointed out that CheckWriter II is the only program that allows the use of personal-checkbook checks. One last point, the ability to batch-print due payments was highly touted in Quicken, but the same ability in CheckWriter II was not mentioned.

Steven HN Lunseth, President
Aatrix Software
Grand Forks, ND

Ether/Or

We were somewhat surprised by the test results you reported for Ethernet-to-SCSI adapters in your September '91 lab report ("Instant Ethernet: 10BASE-T," page 174). Specifically, you found a fairly significant difference in performance

FOR MORE INFORMATION ON ULTRADRIVE X, CONSULT OUR KNOWLEDGEABLE PANEL.

If you're looking for unmatched reliability and convenience, then meet the new UltraDrive X series of high-capacity hard disks from GCC Technologies.®

Only the new UltraDrive 1000X and UltraDrive 650X have a technologically advanced front control panel. With this panel, you'll have immediate access to advanced features like a switch that lets you terminate your hard disk with the push of a button. You'll have the convenience of two LEDs that indicate your disk's power status and whether your drive is reading or writing. There's even an LCD that displays the SCSI ID number up front where it's easy to view.

The panel on the UltraDrive 1000X also offers the added security of a push button write-protect switch. This feature protects your data from accidental loss, making the UltraDrive 1000X perfect for file servers.

We've also engineered the UltraDrive X series with a unique One-Key System Start™ feature. By simply pushing the power-key on your Macintosh® keyboard, One-Key System Start will automatically switch on your Macintosh computer, your UltraDrive X, and one auxiliary device. It even allows you to power down your entire system by selecting "Shut Down."

Our UltraDrive disks utilize Seagate® mechanisms, the most trusted name in high-capacity disks. Every UltraDrive X undergoes the kind of tough temperature and shock tests that GCC is famous for. We're also famous for backing up our claims. So it's no surprise that the UltraDrive series is backed by a full two-year warranty.

Your UltraDrive wouldn't be complete with anything less than GCC's UltraWare,™ a complete collection of value-added software the likes of which others can't offer. UltraWare includes GCC Partitions,™ software that lets you partition information within your hard disk for better data organization. Included free with your UltraDrive is MacTools Deluxe,™ a complete disk utilities package valued at $129.

For just $3,999 for the UltraDrive 1000X and $2,999 for the UltraDrive 650X, you can experience these disks for yourself. One consultation with our knowledgeable panel and you'll know that the UltraDrive X series has the reliability, convenience and performance you need. We offer internal as well as external versions of UltraDrives, in sizes ranging from 20 to 1000 megabytes. So there's sure to be an UltraDrive to suit your needs.

The UltraDrive X series and the complete family of UltraDrives are available from your Authorized GCC Dealer or directly from GCC. Call 1-800-422-7777 for the name of the dealer nearest you or to place your order directly with us.

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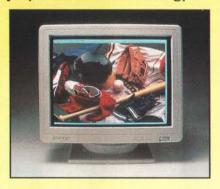
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12112L

CIRCLE 143 ON READER SERVICE CARD.

LETTERS

between the Nuvotech NuvoLink SC-T and our own Ether+. As mentioned in your June '90 article on Ethernet adapters ("Are You Ready for Ethernet?" Buyer's Guide page 20), Nuvotech licenses both the hardware design and the software for the Nuvolink SC-T from Compatible Systems (maker of the Ether+). Thus, there should be no appreciable difference in performance between the two units. Neither should there be variations in software-driver versions to account for the difference.

You also draw a somewhat erroneous conclusion when you state that "the fastest SCSI adapter . . . transferred files from server to client less than twice as fast as LocalTalk." It would be more correct to say that this is the case on a Mac Classic. A SCSI adapter on an SE/30 provides significantly better results.

Matt McConnell, President
Compatible Systems Corp.
Boulder, CO

The speed difference between the Ether+ and the NuvoLink SC-T is not reason enough to choose one over the other — as you point out, both the NuvoLink SC-T and the Ether+ use Compatible Systems' hardware. Nuvotech's superior five-year warranty, however, prompted us to recommend the NuvoLink SC-T. And you're right: Faster CPUs — such as the SE/30 — provide faster SCSI throughput than our Classic test platform. — KW

Crossed in the Mail

To add a dissenting voice to Owen W. Linzmayer's assessment of MyAdvanced-MailList (Quick Clicks, September '91, page 90), I found the program quite simple and learned to use it in less than the five minutes the publisher promised. Except for some cosmetic problems with the envelopes and the lack of postal bar codes, I swear by it.

On the other hand, I found MacEnvelope almost impossible to use and have reluctantly erased it from my LC.

Gary O. Kent
Torrance, CA

Keeping Up with the Dvoraks

As one of those ludicrous bozos who lugs around a utilitarian Mac in a padded case, I would like to apologize to Mr. Dvorak ("The Classic Rage," September '91, page 352). I regret that my existence is an affront to his buy-the-latest-even-if-you-don't-have-the-money sensibilities. Were Mr. Dvorak writing for an automotive magazine, he would no doubt lampoon the poor fool who continues to drive a Chevy when a Mercedes is clearly the better car.

Doug Pinkerton
Memphis, TN

In the '60s, I owned a VW Beetle. Everybody owned VW Beetles. We loved our VW Beetles. Not only did it work all the time and get excellent gas mileage but it also gave us a chance to thumb our nose at Detroit's gas guzzlers. When VW discontinued the Beetle, I bought a new, bigger VW. Funny, I can't remember that model's name when I pass the closed, abandoned VW dealership here in Melborne.

In 1985 I bought my first Mac and got the chance to thumb my nose at Big Blue and the "no pain, no gain" ethic.

Now Mr. Dvorak would like to end production of the dumb little compact Macintosh. I suppose that he will have his way and that the Mac will go the way of the Beetle. I'll buy the next Apple offering, and in a few years, I'll probably wonder if it was an LC or IIfx and what ever happened to the company that made it.

Eden Bitzer
Melbourne, FL

Au contraire, Mr. Dvorak. The Classic shows Apple's wisdom and common business sense. Your post-Yuppie let-them-pay-a-little-more attitude ignores the pent-up demand for Macs from home users, small businesses, churches, and schools that need a wee-bit-lower price point.

Austin Avrashow
Portland, OR

Some things are clearly built for speed.

Hang on! At 17 pages per minute, the new HP LaserJet IIISi printer for the Macintosh runs full tilt. And while other machines may keep you waiting, this one whips through PostScript® printing. With a high-speed engine, more standard memory (5MB, expandable up to 17MB), and a RISC-based formatter, this printer can have your work finished faster than you can shout "the Hewlett-Packard LaserJet IIISi for the Macintosh."

What's more, the built-in true Adobe® PostScript makes this a LaserJet printer manufactured specifically for Macintosh. Simply plug into the LocalTalk network, and your workgroups are ready to roll. Also, the two 500-sheet input trays, a 500-sheet output capacity, and a 50,000-page-per-month duty cycle ensure that it can handle high-volume printing. In addition to quick turnarounds, you gain paper-handling versatility with job offset and a tray-full sensor. And for even greater flexibility, you have the option of adding two-sided printing and an envelope feeder.

Yet what makes all of this worth the ride is the end result.

Others aren't so obvious.
Introducing the LaserJet IIISi
for the Macintosh.
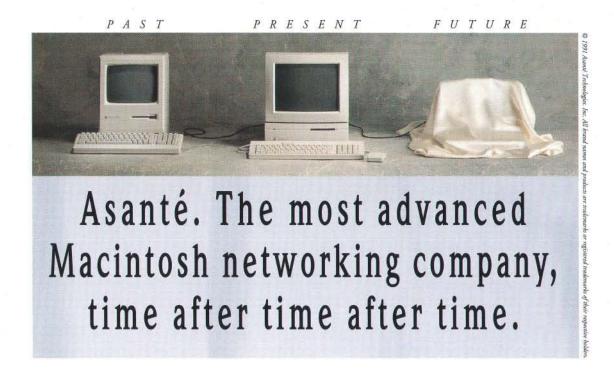
Thanks to our Resolution Enhancement technology and microfine toner, which uses particles 50 percent smaller than other 300 dpi laser printers, your work will have a quality which rivals that of 600 dpi printers.

Perhaps the best news of all is the price. The LaserJet IIISi printer for the Macintosh is only $6,995.* So if you're interested in affordable, express printing with the service and

reliability you've come to expect from Hewlett-Packard, call **1-800-752-0900, Ext. 2607**† for the name of your nearest authorized HP dealer. And discover the printer that will take your breath away.

HP Peripherals
When it's important to you.

HEWLETT PACKARD

A Notebook Quiz

Apple's new PowerBooks, Quadra family, and upgraded Classic II are the answers — if you ask the right questions.

No question: You want one of the new PowerBooks, Apple's long-awaited Macintosh notebook computers. There's also no question that you'd better get your order in ASAP, because your dealer is going to be back-ordered immediately. There's no question that the powerful new Quadra powerhouses can quench your thirst for high-end power or that the Classic II is a notable improvement for entry-level Mac users.

And there's no question that any time Apple unveils six CPUs and two major operating-system additions *and* scores a coup for consumers by fixing a major boo-boo that left tens of thousands of users in the lurch, you're going to have a few questions.

Let's start with the PowerBooks.

Are they bigger than a breadbox?

If you think this is a rhetorical question, you weren't around for the Mac Portable fiasco two years ago. Apple couldn't afford to make the same half-baked mistake twice. Not only are the PowerBooks significantly smaller than a breadbox but they're also sure to be the hottest things since sliced bread. (And that's about enough leavening for one answer.)

Which one should I get?

Another easy question. The answer is another question: How much money you got?

You'll get as much as you want to pay for. The PowerBook 100 is a fine solution if what you need is a note-taking and E-mail machine. If you need a floppy drive, you'll appreciate the PowerBook 140's built-in floppy drive (not to mention its significantly faster performance). If you'll be spending a lot of hours in front of your PowerBook — or need to show colleagues what's on-screen — go for the PowerBook 170, with its killer active-matrix display; you won't find as good a display on any other notebook.

Why is the keyboard configured so oddly?

Ever tried typing on a notebook — any notebook — in cramped quarters (such as on an airline tray table)? You might call Apple's approach a gut reaction; with most notebooks, you end up scrunching the keyboard against your gut. By sliding the keyboard up to the far end of the machine, the design lets you keep your wrists extended; it also provides a convenient place for a built-in trackball. (I find the trackball *button* placement a bit awkward, though.)

What was that "major boo-boo" you mentioned?

Hang on — we'll get to it.

How are the PowerBooks different from DOS and Windows notebooks?

Most important is that they're Macintoshes. This is never so vital as when you're on the road: You don't have all your manuals and reference books handy to check how to do something, you don't have the know-it-all in the office next door to consult, and you don't have time to chase wild geese. Everything you do has to be simple and straightforward.

Most laptop and notebook users end up with at least a slightly different operating system than the one they have on their desktops — Windows on the desktop, DOS on the notebook, different BIOSes or different versions of the same operating system that may introduce compatibility conflicts with the operating system or application software they're used to using. Because you're going to have a different operating system on your notebook anyway, why not opt for the intuitive Mac OS?

Many DOS notebooks offer more MIPS and more computational bang for the buck, but the Mac truly shines at the kind of work you're most likely to be doing on the road, such as sending faxes designed with legible typography, doing WYSIWYG word processing, and accessing your desktop network from a remote location.

There's an old truism that customers should (and sometimes actually do) pick their software first and buy the hardware that runs it in the way that best fits their needs. Hewlett-Packard, heeding this wisdom, scored a hit with its 95 LX vest-pocket computer simply by burning Lotus 1-2-3 into the ROMs. With a PowerBook and 1-2-3 Mac (due any day now), you can get the best of all worlds — the software you need on the hardware platform you crave.

In addition to the ergonomically correct keyboard layout, Apple's other trump card for its notebooks is its AppleTalk Remote Access software (see this month's Bridges section for details). Remote Access runs on any (current) Mac, but with a PowerBook, you'll wonder how other notebook users manage to live without it.

What's missing?

A case, for one thing. After the unwieldy Mac Portable drove everybody (except chiropractors) crazy, the last impression Apple wanted to convey was that of bulkiness. Fortunately, for those who want the extra protection of a case, there are several third-party products to choose from. T/Maker's PowerBundle gives you not just a case but a whole case load of

goodies as well. The software products included in the PowerBundle—a personal-information manager, a library of special-purpose fax cover sheets, expense-report software, and more — were chosen to reflect the kinds of things you're most likely to need in remote locations.

What about non-Apple notebooks?

Colby Systems, DynaMac, and Outbound Systems all offer portable and notebook computers that involve different trade-offs among portability, power, and expansion options (see "Mac to Go," November '89, page 96). Outbound's new Notebook System has the unique ability to grow along with your requirements—and your budget. The hard drive, the memory, and even the CPU are all modular; you can easily slide them out to install an upgrade. It's a slick machine, definitely worth serious consideration.

If I get a PowerBook, will I still need a desktop machine?

Probably. The problem with notebooks is that to fit everything in, the manufacturer has to make some compromises, such as different motherboard architectures and alternative input/output ports. This means that you won't immediately have all the expansion options you need (although there are already dozens of third-party add-ons, many of which are highlighted in "Introducing: The PowerBooks," in this issue).

To make your desktop computer obsolete, you'll need a product that doesn't exist — yet. The missing half of the notebook equation is a docking station — a home port into which you can slide your PowerBook. The docking station would seamlessly tie you to your network connections and to all the peripherals you keep on your desk, including the full-sized keyboard, mouse, color monitor, and mass-storage device. If you worked at more than one location — your office, your office at home, your client's office — the Power-Book would function like the cab of a big-rig truck: It functions adequately by itself when it's shuttling between hookups (relying on just the minimal material you keep in the glove compartment), but the real payoff comes when you hook it up — easily and instantly — to the payload at your pickup point.

Besides, what you'll really want on your desktop is a Quadra.

So what's the deal with the Quadras, anyway?

The Quadras are basically just the logical evolution of the high end of the Mac family, with 68040 microprocessors for cutting-edge performance and room inside for lots of expansion and loads of high-end peripherals. If Apple had implemented some of the wish-list features for the Quadra 900 (the "tower") — such as built-in optical storage, sophisticated networking capabilities, and fault-tolerant redundant backup — it might have boosted the 900 into the league of server-class minicomputers. With those kinds of features, Apple might have stood the workstation market on its ear — instead of just turning

the CPU on its side. Nonetheless, it's an impressive machine for color DTP, server chores, and other applications where your souped-up IIfx is feeling its limitations.

While I'm waiting for that back-ordered PowerBook or Quadra — or **waiting until my budget catches up to them — what else is hot?**

This month's *MacUser* 100 has something guaranteed to intrigue, amuse, and satisfy everybody — and each item costs less than $250. Here are five more late-breaking arrivals we've come across:

1. The Far Side Computer Calendar. Gary Larson's first venture into software (from amaze!nc, of Kirkland, Washington) is just the ticket if you need a daily dose of weirdness. It's easily the funniest calendar/scheduling software you've ever seen.

2. Band-in-a-Box. When someone asks if you know any fun software, do you answer, "No, but if you hum a few bars, I'll fake it"? If so, this is the software for you. Pick a tune from its library or enter chord symbols for virtually any song, and Band-in-a-Box (from PG Music, of Buffalo, New York) generates an instant professional-sounding three-piece rhythm section — drums, keyboards, and bass — to back up your solo. All you need is any multivoice MIDI synthesizer (such as the new portable Yamaha QY10).
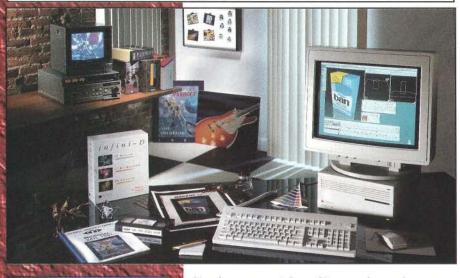
3. System 7 — The Movie. You keep trying to delve into the System 7 manuals but keep deciding you'll wait for the movie. Here it is, on CD-ROM. This training tool from The Whitley Group, of Charlotte, North Carolina, will get you up and running before you can finish your popcorn.

4. TechWorks' Memory Upgrades. Packaged in arrestingly brightly colored point-of-purchase blister packs, memory now joins the ranks of breath mints and scandal tabloids as an impulse purchase at the checkout counter of the neighborhood superstore near you. The upgrade packs from TechWorks, of Austin, Texas, are clearly labeled to ensure that you get the right kind of SIMMs for your CPU (especially handy if you've sent someone to the store for a six-pack of Jolt, a box of Twinkies, and a 4-meg upgrade).

5. MODE32. Here's the boo-boo fix. Apple billed all of its current CPUs as being System 7-compatible. Well, unfortunately, the II, IIx, IIcx, and SE/30 aren't. Their ROMs are unable to exploit the 32-bit-addressing capabilities of System 7 that give you access to as much as 128 megabytes of memory in RAM and 1 gigabyte of virtual memory on mass-storage devices. Connectix's MODE32 utility solves that problem, and Apple is making this software available at no charge through a variety of channels — including Apple dealers, user groups, and on-line services — and is offering a refund to owners of those machines who have already bought MODE32.

So, yes, Virginia, sometimes there really is a Santa Claus. The question is, Will he be able to squeeze a Quadra 900 down the chimney?

Last night, someone stole Dave's car. And the scary part is, he never even knew it was gone. The same thing can happen to you if you're leaving your Mac unlocked. Co-workers can cruise through your files, causing accidents and leaving viruses. Or thieves can take what they want—and trash the rest. All good reasons to get DiskLock.™
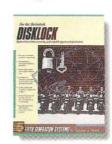
DiskLock doesn't let anyone into your system without your password. It automatically locks your drive when you shut down, and you can set it to lock when

your Mac's been idle for a specified time. Plus, DiskLock lets you choose from three levels of security, including the government standard, DES encryption. That's serious protection.

Just load it and forget everything except your password. DiskLock is the first program to let you lock individual folders or files, as well as your entire drive. You can set different passwords for specific files and give your system a fail-safe master password. DiskLock even alerts you when anyone tries to get into your system. And it

automatically checks itself for viruses.

You never know who might have designs on your next project. So protect it with DiskLock. For more information, call 1-800-873-4384. Buy DiskLock, and we'll send you a free locking diskette box. Just write "Dave's car" on the registration card and return it to us. This is a limited-time steal of a deal, so act now.

From the Desk of

Move over, Mr. Sculley: Apple's got a new CEO to go with all those new Macs. And it's time to make some changes.

The personal-computer business is in a panic these days because of slower sales growth, lower margins, and general uneasiness about where the industry and the economy are headed. In light of this, two of the sharpest people in software — Bill Gates, of Microsoft, and John Walker, of Autodesk — have written internal memos about the challenges and issues their respective companies face. Also, an employee of IBM recently supposedly posted some of the harsh remarks that CEO John Akers had to say at an IBM managers' meeting about IBM's performance.

The two documents and Akers' remarks got a great deal of press. I guess it's hip these days to communicate bad news and potential threats to employees — thereby scaring them into greater efforts. I've waited for Apple to do this, but it hasn't been forthcoming. Thus, I've decided to do it for Apple. (If I can't be on the board, I might as well try to be the CEO.)

My Fellow Apple Employees:

As we enter the first quarter of fiscal year 1992, it is appropriate and important to discuss the issues and challenges Apple faces in the coming year. My purpose is not to frighten or alarm you. Rather, I seek to communicate my thoughts so that we may go forward with one purpose and one resolve.

I've divided the most important issues and challenges into three categories.

Category 1

This category contains issues we control and are therefore entirely responsible for dealing with. Frankly, we can hurt ourselves more than most external forces such as competitors and the national economy can hurt us.

•**Leapfrog Macintosh.** Our greatest technical challenge is creating a computer that leapfrogs Macintosh just as Macintosh leapfrogged the IBM PC (and the Apple IIe, but it's not politically correct for me to say that). In the next five to seven years, Macintosh technology will reach the end of its lifetime, and if we don't cannibalize Macintosh sales, someone else will. Nothing is more important to Apple's long-term viability than accomplishing this goal.

•**Customer support.** Championship teams have both a great offense and a great defense. Our offense must create world-class innovative products. Our defense must provide world-class empathic customer support. We have taken positive steps, such as our toll-free and System 7 telephone lines, to improve customer support, but this isn't enough. Apple's customers express surprise when they receive support; Nordstrom's customers express surprise when they don't. We should be the Nordstrom of the personal-computer industry. This is the responsibility of Apple employees every time they come into contact with the public.

•**Corporate bulimia nervosa.** Our binge-and-purge hiring practices must end. We're not building a stable management structure, and employees seem more concerned with saving their skin than with changing the world. If we need to, we will take short-term earnings hits in order to keep our people. We will also cut back on the perks and luxuries of working at Apple so we can afford to keep people. In the long run, a stable work force will lead to greater earnings and higher stock prices.

•**Bozo explosion.** Given a commitment to long-term employment, we must carefully scrutinize who we are hiring, because new employees will be with us for a long time. In the past, we've used lower earnings projections to justify laying off bozos and have had less fear of lawsuits. We won't be able to do this anymore. When we hire people, we must remember that only two things matter: their ability to perform in the position and their love of personal computers. I encourage you to look beyond paper qualifications such as educational background and work experience. Let's draft the best athletes, not hire has-beens who "have done it before" somewhere else.

Category 2

This category contains issues that involve external constituencies. Although we do not solely control these relationships, I believe that we can conduct our affairs much better.

•**Third-party developers.** Third-party developers provide the reason to buy our computers. In the past few years, unfortunately, we seem to have forgotten our friends. Because of budget cutbacks, for example, we've concentrated on several hundred developers (the "A list"). Some of the most innovative and loyal developers, however, are not on the A list, and they are being shuffled to the side. The two most important attributes of our third-party developers are product quality and loyalty to our products. Size, brand-name awareness, and how much an industry analyst likes a company are inconsequential.

•**Early adopters.** When Apple stands tall, it's because it has one foot on a shoulder of third-party developers and the other on a shoulder of our early adopters. Early adopters

GUY KAWASAKI

are the people who bought an Apple II and a Macintosh 128K and who have been with us for years. These people are the roots of Apple, so let us not be seduced by big numbers in business and forget our loyal fans. Remember that when we introduce the computer that leapfrogs Macintosh, these will be the first people to step up to the plate while big business hems and haws about installed base, backward compatibility, and its "investment" in Macintosh.

•**Loving Microsoft (to death).** Let me make one thing perfectly clear: Microsoft is one of our most dangerous threats. The best scenario for our relationship with Microsoft is détente, not alliance. We should unabashedly promote Microsoft and its products only if and when it unabashedly helps us sell more Macintoshes. The key to our Microsoft strategy is recognizing that Microsoft can furnish key applications and signal acceptability of Macintosh until other developers produce better products. Let's not be naive about what's going on. Let's think of Microsoft as a mighty opposite: If we can control or defeat Microsoft, we can dominate the personal-computer industry.

•**The IBM alliance.** Our newly formed relationship with IBM is an important step toward achieving legitimacy in the business market. (I hope you don't think that we really care about IBM's technology.) We should capitalize on this relationship when people doubt the desirability of our products: "If it's GUI enough for IBM, it's GUI enough for you." The IBM relationship, however, is not a panacea or a guarantee of success. IBM is looking out for IBM; Apple is looking out for Apple. Sometimes our goals might overlap; sometimes they won't. At all times, we are responsible for our own fate. IBM walked away from Rolm; it will certainly walk away from our alliance too if it becomes advantageous to do so.

•**Crisis in the computer-store channel.** Jean-Louis Gassée used to say that Apple should do what's right for customers and that then all the other pieces would fall into place. One right thing we've done is recognize that people want to buy our products in a no-frills, economical way, and thus we've authorized superstores as Apple resellers. Our goal is not to *create* a crisis in the computer-store channel but to do what's right for our customers. Frankly, the crisis may indicate that computer stores have not provided value that customers are willing to pay for. Our position will be to support computer stores as well as superstores and let customers decide where to buy their Apple products.

Category 3

This category contains issues that are not widely recognized or perhaps have been incorrectly dismissed.

•**NeXT.** We should not take the competitive threat of NeXT and Steve Jobs lightly. His computer offers a very attractive price/performance ratio that competes directly with the high end of our product line. All his talk about "professional workstations" is just a smoke screen until he has the software and production and buying capacity to produce a "personal computer." Steve, no matter what he publicly professes, wants to create three of the four personal-computer standards. Eventually he wants to own it all.

•**Sony.** We are one of Sony's biggest customers, and Sony has worked with us in the design of one of our new computers. Neither of these facts, however, should cloud the fact that Sony could be a formidable competitor in the personal-computer market if it ever decided to enter it. Sony, frankly, is one of the few companies that could acquire Apple and successfully operate it after the acquisition occurred — to wit, Sony's handling of CBS Records has been exemplary. Let's keep our eyes open when we deal with the slant-eyed devils from the East.

Thank you very much for reading this memo. If you have comments about it, please contact me on AppleLink. I look forward to a bright future for Apple and all its employees.
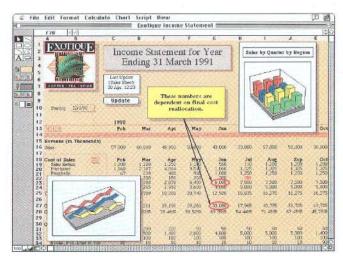
Sincerely,

Guy Kawasaki, self-annointed CEO

(By the way, when I worked for Apple, I always hated it when some yo-yo analyst or reporter wrote about what he or she would do if he or she were running Apple. I always thought, "If you think you're so smart and it's so easy, why don't you try to do our job?" Now that I'm on the other side, I won't forget my past.

The world can be divided into two groups: those who make history and those who write about it. Now that I'm in the second group, let me state that I couldn't do a better job than John Sculley. Nor would I want his job for the $2 million to $17 million [depending on options] he makes each year. On the other hand, he couldn't write a column as good as mine, and he wouldn't want to write it for what I make, so we're even.) 🖱
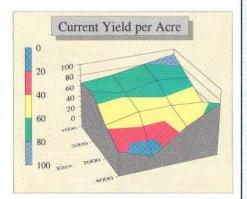
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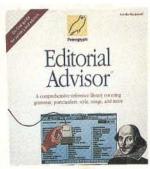# LAN Zone of Connectivity
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00228	Mac Con + 30i ET 64	304
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02701	Etherport SE	350
02702	Etherport SE/30	350
02542	Shiva Telebridge	408
02700	Etherport II	350
02985	Ethergate	1295
01615	Shiva Netmodem V2400	338
03251	Shiva Netmodem V.32 9600	1165
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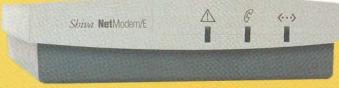
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Shiva Net Modem/E

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Shiva **Net**Modem/E

NetModem/E is a stand-alone Ethernet
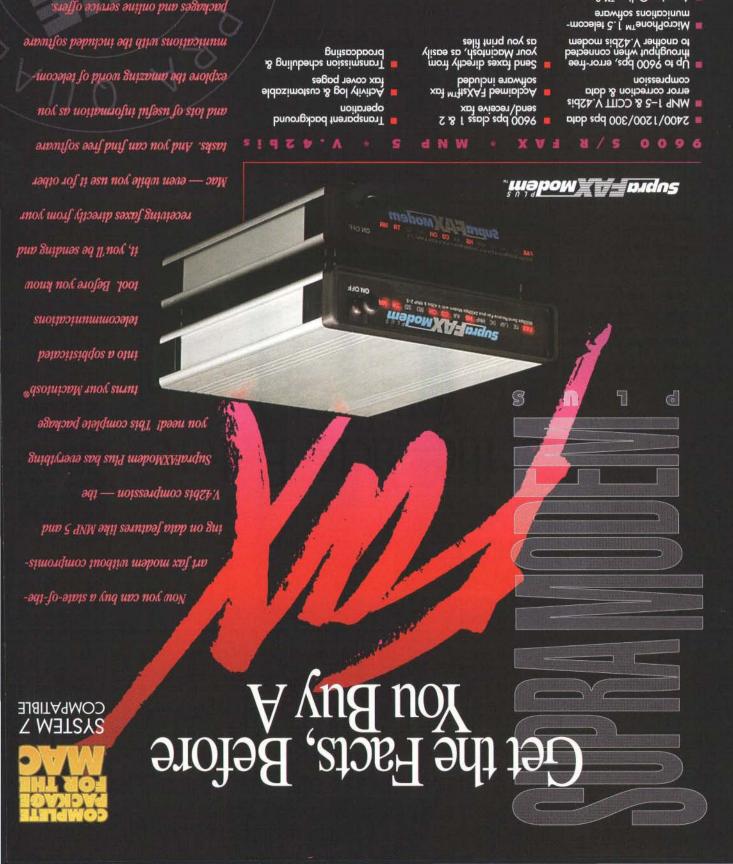
communications device designed to meet three LAN communications needs. It allows remote workstations to dial in with full access to network services, lets LAN workstations call out to remote information services or hosts, and joins geographically separated networks in a routing connection over ordinary phone lines. #04129

Shiva Shiva Hublet

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The Shiva Hublet is a stand-alone local concentrator for 10BaseT networks allowing multiple nodes to connect to a single network drop. Its four ports provide connection to Macs and PCs, workstations or any 10BaseT device–making it the "power strip for 10BaseT." #04156

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00199	TE-447 RJ-45 Patch Panel	199
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00831	Repeater	309
00955	Phonenet - Db-9	34
03475	Star Connector En Pn 501	120
00828	Phonenet Din 8 (10 Pk) Pn 310	197
02751	Star Connector (10Pk) Pn311	125
00832	Phonenet - Din-8	32

Nuvotech
01226	Turbo Net To Appletalk Adapter	6
01929	Turbo Net St - Db-9	29
01918	Turbo Net St - Din-8	29
03341	Turbo Net St 12 Pack Din-8	278
01225	Turbo Net - Db-9	19
03340	Turbo Net 12 Pack Din-8	198
01224	Turbo Net - Din-8	19

Sitka Tops
02223	Teleconnector - Din-8	22

NuvoTech NuvoLink II

NuvoLink II-T is a 10Base-T compatible, internal NuBus Eternet card for Macintosh II computers. It's a high-performance Ethernet solution offering low-cost, faster communications. It also features an AUI port, making it adaptable for thick Ethernet wiring. #03119
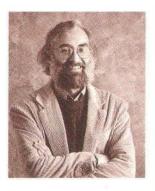
What's News

The computer business is never short on news, but to stay one step ahead of the industry, you'd better look beyond the headlines to where the big changes are brewing.

So much news: Every page of *MacUser* is crammed with it — news of the latest and greatest and the would-have-been-great-if-it-hadn't-been-so-late. With so much news, there must be a lot going on in this computer industry, right? Well, yeah, but there's news and news and, I venture to add, news. This is a column about computer-industry news, some of its varieties, and what can be learned from a taxonomic view of technological innovation.

Is News Really Necessary?

But first: Isn't it all just hype and hoopla?

No, news is the spoor of change, and change is the essence of this industry. There really is a lot going on, and it really has significance. Granted, it's mostly a modest sort of significance, not the historic significance of the collapse of Soviet Communism or the global significance of the destruction of the Amazon rain forest but rather the practical significance of increased productivity. A poor thing but our own.

Increased productivity just means getting more done in less time, an end toward which there are many means. Buying bigger bullwhips and going to war are known to increase productivity but are generally thought to have undesirable side effects. The means provided by the computer industry are largely benign, because computers and software generally function as tools. Tools let you do something you couldn't do before or do something better or faster than you used to be able to do it, which is generally a good thing. Tools also have the characteristic that they are understood to be for the use of individuals, and the individual tool user is often, and properly, regarded as the expert on the usefulness of the tool.

To employers, increased productivity means free money. It doesn't take a genius to sell free money. That's why one shouldn't be too awed by the spectacular successes of the industry's wunderkinder. James Wilson Marshal, the man who started the California gold rush at Sutter's Mill, wasn't a gold-mining genius; he just saw the sparkles in the stream. The mother lode of increased productivity shows no sign of being tapped out, and as long as it's there, we can expect to see new developments that further increase productivity. And new developments are news.

But as I say, there is news and news and news. To a certain extent, you can assess the industry's direction and vitality by weighing the kinds of news you get. There are at least three kinds: new products, new standards, and new paradigms.

Products and Productivity

The most common kind of news is new-product news: leaks, preannouncements, announcements, reviews, bug fixes, leaks about new versions, preannouncements about new versions, and so on. Every new product is a step in the march of technological progress. Sometimes the steps are pretty small. In fact, the steps are definitely smaller than they ought to be from a technological viewpoint, and there is a reason for this.

Selling a product in the computer industry normally means making the productivity argument: This product will increase productivity more than competing products will. New products all promise to deliver increased productivity, and they succeed if they deliver or seem to deliver on that promise. There is an odd phenomenon in the pushing of new products, though: the power of software categories. Why do most new products fall into established categories?

The answer may seem obvious: It's easier to sell into an established product category than to invent a new one. The first product in a category often holds on to the largest market share, but you can be sure that this position was bought at some expense. Later products don't need such a large market share, because they did not participate in the expensive process of category creation.

But that isn't enough of an answer, because software is not like other kinds of products. Everyone knows what a car is supposed to do, and you can't sell a car that doesn't do what a car is supposed to do. Software design is inherently vastly more flexible than automotive engineering, though. It's easy to design a software product that has unique functionality, that does things no other software product does. Unique benefits are something software products can offer more easily than can any other kind of product, and they ought to be a strong selling point. So why are so many software products defined so conservatively that they end up in a category that is already crowded with competitors?

I suggest that it's because software purchases are more pragmatic decisions than car purchases are. Even though cars cost a lot more than do software packages, frivolous factors seem to enter into car purchases more often

MICHAEL SWAINE

than they do into software purchases. This makes sense if a program is a tool and a car is, well, something else. Tools are purchased on the very practical basis of productivity. (The "feel" of a software product, like the heft of a hammer, is, I argue, part of the assessment of its ease of use and thus of its productivity value.)

If you can't explain quickly what productivity enhancement the tool offers, you can't sell it. Some would say that Hyper-Card is a case in point. (Some would say that, and some would say that if you give a product away, you can't sell it. Hyper-Card will get its first test as a real product five years into its lifetime if Apple ceases to bundle it with Macs next year.)

Some of the antagonism toward the Mac back in 1984 may have been because of the perception that it was being sold as something other than a tool, with something other than a productivity argument. I think that part of the problem was that the sales pitch was category creation on a large scale, the scale of a true paradigm shift. But more about that presently.

Bearing Standards

Some news isn't about products at all but, rather, about standards. The Multimedia PC. SQL. Apple events. Client/server. PC compatibility. GIFF. OSI. But all that is old standards news. The year 1992 promises to be as rife with new standards in the computer industry as in the arena of international trade. What are standards about?

Although standards can specify anything from a data format to a configuration of computers, network software, and applications, they all represent agreements among vendors and they all attempt to bring order and compatibility to products from different vendors. They can be thought of as tweaks to the industry itself or as part of the industry's maturation process. They alter the granularity of competition and, at least in principle, present the customer with more choices or choices at a more detailed level. When they succeed in giving the customer more options, they move the industry further from the early pre-personal-computer days when each customer dealt with one vendor for both hardware and software.

So when, as is currently the case, the news is full of new standards, it means that the industry is maturing. Maturity, in industries as in bananas, is something to view with suspicion, and the suspicion that all this standards activity is at the expense of real technological progress is probably justified. If new products are steps in the march of technological progress, standards are stops to assemble the troops.

Sometimes, though, new standards can create new platforms by providing vendors with a plausible market. Multimedia may be a case in which the troops are assembling for a charge.

What Color Is Your Paradigm?

The collapse of Soviet Communism is a paradigm shift. The computer industry has its paradigm shifts too, which can be recognized by fundamental changes in the way people work with computers. A paradigm shift in the computer industry doesn't have to be a technological innovation, though.

VisiCalc was probably the first real paradigm shift in personal computers. It was the first spreadsheet program; before it, interacting with a computer was pretty much a linear thing. Information could be displayed graphically, but not until Visi-Calc could you work directly on a two-dimensional representation of data. There was nothing that VisiCalc accomplished that existing software couldn't accomplish; rather, VisiCalc changed the way people interacted with computers.

The Macintosh and its forebears were a paradigm shift too, extending the 2-D display to all levels of interaction with the computer and introducing object representations of data and programs and direct manipulation of the objects via a mouse.

There are some new paradigms on the horizon. Workgroup computing may be a successful new paradigm, although its success may depend on vendors' ability to package it in the form of tools for individuals. Without the clear perception that a product is a tool, the productivity argument is weak. And tools may actually always need to be designed for individuals; group tools may be a nonconcept.

Pen-based, or notebook, computing is clearly a new paradigm, one that could make computers accessible to vastly more people than now use them. It doesn't require typing skills, eliminates the abstraction of working down here to produce an effect up there, and gets the computer off the desktop — as revolutionary a shift in patterns of computer use as I can recall. It will change the way we all work with computers. It will be maddening, disruptive, confusing. As a computer columnist, I look forward to it eagerly. 🖱

Scan Words...

TYPIST
PLUS GRAPHICS

Everyone agrees that the *Typist*™ is the best thing that ever happened to hand scanners. The ability to read words and numbers easily and accurately really makes a difference when you're pressed for time. Or like most people you simply hate to type.

With the *Typist* you can scan almost any document just like you were typing it yourself; into just about any PC compatible or Macintosh® word processor, spreadsheet or database.

It's not surprising then that the *Typist* has so quickly become the hand scanner of choice when it comes to OCR. The clear standard.

So you might say that the writing was already on the wall, and it was only a matter of time before the *Typist* allowed you to scan and edit graphics as well.

That's why Caere® Corporation created the *Typist Plus Graphics*™, the hand scanner that adds yet another dimension by allowing you to scan and enhance photos, artwork and illustrations with incredible ease and accuracy.

The *Typist Plus Graphics* lets you put your best image forward because of a major innovation called the *Graphic Editor*™, which creates full tone images – 256 shades of gray – in software. You can display grayscale images up to the full capacity of your screen; modify and edit in either grayscale mode for photographs, or black and white mode for line drawings; and later output in picture perfect form.

In fact, when it comes to printed output, the *Typist Plus* includes *LaserGray*™, yet another proprietary technology from Caere. So you can print halftones that look just like grayscale images. The photos that

Now Graphics.

you modify on-screen have a crisp, sharper look and feel. A professional touch.

Just think of what the addition of picture perfect graphics can mean for your business or profession.

Use the *Typist Plus Graphics* to capture photos that you can incorporate into your most critical business presentations or reports. Scan company logos and place directly onto your stationary, invoices or slide presentations. You can add graphics to all of your Macintosh desktop published documents, including training manuals, newsletters –

even invitations to company events.

The word is out about the *Typist Plus Graphics*. Now you get the full picture – words and graphics – in one intuitive and easy-to-use hand scanner.

To learn more about the *Typist Plus Graphics* and how it can be of assistance to you, contact one of Caere's authorized dealers. Caere, the Complete Recognition Company.

For more information:

Call: 1-800-535-SCAN

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Los Gatos, CA 95030

CAERE ®

CIRCLE 25 ON READER SERVICE CARD.

Division of labor: Here's an easy way to double your productivity — get a second machine to do half the job. Divvying up a single task among several networked computers is what distributed processing is all about, and with IAC in System 7, it's coming to the Mac. ☞ DreamNet, from the French developer Ray Dream ([415] 960-0768), is the first demonstration of the technology. DreamNet is an extension that works in conjunction with Ray Dream's 3-D-graphics package, Ray Dream Designer, providing that package with distributed rendering. Using DreamNet, one user on a network can access any number of other users' machines that also have the DreamNet extension installed and active. These remote machines, which, in a classic Gallic touch, Ray Dream calls "consenting" Macs, then become additional rendering processors for the primary Mac, giving up a user-definable amount of their processor time to the distributed task. When they've finished with their portion of the job, the consenting machines return their work to the originating Mac, which then assembles the final rendered image. Although DreamNet is being shown as a rendering engine, Ray Dream's plans are much broader: The company plans to turn DreamNet into a general distributed processor that any IAC-aware application will be able to use to complete a given task. ☞ Sticking strictly to 3-D rendering, Strata ([801] 628-5218) has announced RenderPro, an add-on to Strata-VISION 3d. With RenderPro and an extension installed on all Macs on a network, a rendering job can be distributed across the network. The RenderPro system is designed to check for changes in the network, so if one workstation crashes or if another comes on-line, it reallocates the work remaining to be done, based on the available computing power. Distributed processing holds enormous promise for increased productivity; after all, the best way to finish a job in half the time is to do only half the work.

Up to Date . . .

Quicken, Intuit's popular check-writing program, has finally had a major upgrade. Version 3.0 includes more account types (including credit-card accounts), better reporting, business-accounting features, and CheckFree electronic bill-paying support. (415) 322-0573. $69.95. ☞ Only four months after its initial release, Infini-D, Specular International's 3-D-graphics package, has been upgraded to version 1.1. New features include System 7 support, improved PICT and PICS mapping, and improved bump mapping. (413) 549-7600. $895. ▨

Hewlett-Packard's Storage System for Macintosh is a rack system that can house as many as seven SCSI drives, including high-capacity hard-disk, DAT, CD-ROM, and erasable optical drives.

HP's Rack of Bytes

If you think that single-enclosure storage sounds like a good idea, Hewlett-Packard has a product for you. HP's Storage System for Macintosh lets you pack as many as seven half-height or three full-height HP SCSI devices into a single cabinet.

Designed specifically for the Mac, the HP Storage System offers a range of SCSI drives, including 3.5- and 5.25-inch hard-disk, DAT, CD-ROM, and erasable optical drives. The hard drives are SCSI-2 devices and have capacities ranging from 235 megabytes to 1.355 gigabytes. The DAT drives can store as much as 2 gigabytes on a single tape, and HP includes a copy of Retrospect Remote, from Dantz Development, with every DAT drive. HP's erasable optical drive can store up to 590 megabytes per cartridge (295 megabytes per side). HP includes a copy of Norton Utilities for the Macintosh with every system.

Although the price of each system depends on the devices selected, HP estimates that a rack with a drive and one of the backup options (either the DAT or the erasable optical drive) will have a suggested list price of less than $10,000.

Hewlett-Packard Co., 19310 Pruneridge Avenue, Cupertino, CA 95014; (800) 752-0900. Price depends on configuration.

Word Tools Up

Although Microsoft won't completely upgrade its Mac line this year, the software giant has taken another big step (after Mail 3.0 and Excel 3.0), with Word 5.0, which should ship in early 1992. As was the case with Excel, the new Word includes many user-requested improvements — including some from *MacUser* staff members — plus many new tools.

The biggest change to Word is the addition of a tool bar that, not surprisingly, is very similar to the tool bar Microsoft added to Excel 3.0. Using the tool bar, called the Ribbon in Word 5.0, you can switch to the eight-color drawing layer; add columns; choose a font, size, and style; and add bold, italic, and underlining — all with just a click on a button or a selection from a pop-down list.
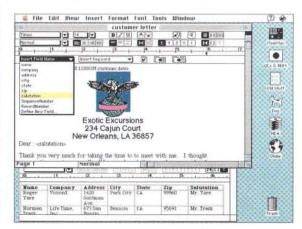
Word's mail-merge function has always been powerful, but until now, you had to fight your way through the process. With Word 5.0, Microsoft has finally given its mail-merge an interface. You set up your data document in a Word table and then create a merge document simply by picking the appropriate field names and conditionals from pop-down lists — all the necessary delimiters are inserted automatically, so you don't have to remember the key combination for «» (that's Option-\ and Shift-Option-\), for example. In addition to letting you preview the actual merge, Word 5.0 includes a syntax checker that goes through the merge to make sure that everything has been inserted correctly.

And speaking of functions that check your work, Word 5.0 includes a greatly improved spelling checker — not only is it much faster but it can also make suggestions based on punctuation, phonetics, and repeated words — an integrated thesaurus, and a new grammar checker. Word can also now search-and-replace formats and styles, including style sheets.

The new version has a modular design, so you can add more capabilities by installing as many or as few modules as you need. For example, Microsoft includes a full-blown equation writer that's an installable option. Word also now supports the XTND architecture, although it will ship with only a MacWrite II XTND filter. An XTND translator bridge, which will ship shortly after the package's release, will give you full access to any XTND-compliant translator set, such as DataViz's MacLinkPlus/Translators.

The new Word fully supports System 7, including publish-and-subscribe, Balloon Help, and Apple events. It also supports Microsoft's OLE (Object Linking and Embedding) standard for live data exchanges and updating among applications.

Microsoft says that most of the features that it added and improved in Word 5.0 came about as a result of user requests. We have no way of knowing if this is true, but we do know that two features were added as a result of our suggestions. You can now triple-click anywhere in a paragraph to select the paragraph (the Bortman feature), and Word documents remember the view they were last saved in, so an outline saved as an outline will now open in outline view (the Ito feature). Hey, if we don't toot our own horns . . . .

Microsoft, One Microsoft Way, Redmond, WA 98052; (206) 882-8080. $495.

Word 5.0 includes many user-requested features, including two from the *MacUser* staff. Among the biggest changes is the addition of the Ribbon, a tool bar for commonly used functions. Mail-merge has also been vastly improved.

NEC's MultiSync 4FG monitor is a 15-inch multisync display that includes custom-color capabilities and ergonomic features — and costs less than Apple's 13-inch RGB model. The FG line also includes 17- and 21-inch models.

Eyes on NEC

When it comes to video, what you see isn't always what you get. Which is why customizable monitors will become more common as time goes by. NEC's unique MultiSync FG family of monitors is one of the first such lines we've seen, and it deserves attention.

All the FG monitors (the 4FG, 5FG, and 6FG) use "flat square" displays and can sync to Mac video. The 5FG and 6FG are 17- and 21-inch models, respectively, whose precise desktop size will depend on the card that drives them. Mac users will be most interested in the 4FG, a 15-inch-diagonal unit that costs less than Apple's 13-inch model but that can still be driven with standard 640-x-480-pixel video. Like the other models in the line, the 4FG has several ergonomic features, including an integrated tilt/swivel base, compliance with the Swedish standards for magnetic-field emissions, and reduced static electricity.

The FG series' biggest edge comes in its color controls. With NEC's AccuColor software and the front-panel controls, you can adjust the monitors' video guns individually, setting the red, green, and blue values based on your personal preference or to match those of printed output or another monitor. Once you've defined a custom setting, you can save and recall it just by throwing a switch. Two custom settings can be saved in addition to the factory defaults, which can't be changed.

Using a series of controls on the front panel, you can also position images horizontally and vertically and adjust their size, control the amount of pincushioning on the sides, and degauss the screen. Brightness and contrast can also be controlled, but NEC's design lets you make those adjustments without affecting the displayed colors.

And to complete the line, NEC was due to announce a single video card for the FG family in November. The card drives all the monitors at their full screen dimensions, so the 4FG, for example, will be capable of producing a desktop of 800 x 600 pixels instead of Apple's smaller 640 x 480. The card will be available in 8- and 24-bit versions; the 8-bit edition will be upgradable to 24 bits.

NEC Technologies, 1255 Michael Drive, Wood Dale, IL 60191; (708) 860-9500. 4FG, $899; 5FG, $1,599; 6FG, $3,499.

PrecisionColor Fits All

As the number of monitors available for the Mac has increased, so has the confusion about finding the right card to drive them. Radius has come up with two accelerated-video-card solutions: the 8-bit PrecisionColor 8X and the 24-bit PrecisionColor 24X.

The PrecisionColor 8X/24X accelerated cards can drive a variety of monitors at resolutions as high as 1,152 x 882 pixels (a 21-inch display). In addition to Radius monitors, other monitors that the PrecisionColor boards can drive are those from Apple, E-Machines, RasterOps, and SuperMac Technology and even VGA and SVGA PC displays.

For flexibility, the PrecisionColor 8X card is user-upgradable to 16- and 24-bit configurations; you simply fill the open VRAM sockets on the card with additional memory. Mac IIsi owners who get the PrecisionColor cards can install them right out of the box, because Radius includes a NuBus adapter.

Radius, 1710 Fortune Drive, San Jose, CA 95131; (408) 434-1010. PrecisionColor 8X, $899; PrecisionColor 24X, $1,999.

Radius Acquires Apple Video Technology

SAN JOSE, CA — Scoring a digital-video coup, Radius has acquired the exclusive rights to an Apple-developed digital-video technology currently called Touchstone. The Touchstone technology includes advancements in 24-bit convolution, variable window resizing, new bus architectures, and QuickTime-optimized software. The convolution technology lets Touchstone output flicker-free 24-bit graphics directly from the Mac to videotape. Previously, Mac graphic output to videotape was limited to 8-bit color. The window-resizing technology makes it possible to resize windows displaying live video in real time without any degradation in image quality. The new bus architecture, called HBus, overcomes the NuBus bandwidth bottleneck, allowing faster card-to-card communication than was possible over NuBus. The Touchstone software will also add a control panel that will let users export any current screen directly to videotape. Radius expects to introduce its first products using the technology in early 1992.

Truevision/RasterOps Merger Off

SANTA CLARA, CA — Three months after announcing their plans to merge, RasterOps and Truevision have called the deal off. The companies announced that the cancellation had been arrived at mutually when the parties could not reach a satisfactory agreement on the nature of the merger. Both companies will continue to operate independently.

Adobe Buys ReelTime

MOUNTAIN VIEW, CA— In a surprising move, Adobe Systems has purchased SuperMac Technology's ReelTime, a software package for editing digital video. Terms of the sale were not made public, but the companies did announce that they would jointly continue to develop the package. SuperMac will bundle ReelTime with its VideoSpigot and VideoSpigot Pro digital-video-capture and -playback systems for the first 90 days of those packages' availability. Adobe says that the ReelTime purchase was part of a general plan to establish a desktop-video standard as broad as PostScript. ReelTime was scheduled to ship in November as a stand-alone package under the name Adobe Premiere and was expected to list for $495.

I brought in my own one's smiling now.

FoxBASE+/Mac to read the database files they had on the PC (it reads Fox and dBASE IV/III+ files directly). I added a memo field into which I cut and pasted pictures that our DTP department had for our customer literature. Then I used the MacDraw-like screen painter to create a great color Mac output screen.

The sales analysis was easy, too. I had to create new screens but FoxBASE+/Mac ran the rest of the dBASE III+ program just fine. (It typically runs as much as 95% of standard FoxBASE+/PC and dBASE III+ code with no changes.)
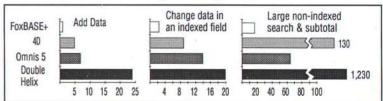
And I built the reports I showed them from scratch. With no programming at all.

If you're looking for a better way to manage your data, call Fox Software and ask for their free demo. It limits the number of records you can store, but is the full program, so you can check it all out for yourself on your applications.

Around here, MIS has been pretty busy the last few weeks. They've hooked up Macs and PCs on an Ethernet network and our information and data processing systems are looking great.

They're building Hypercard-like applications I see people using all over the place.

Accounting likes all of this because the single-user version lists for $495, and the unlimited Multi-User version is only $695.

And even the PC programmers are happy. I hear them talking about things like the great trace and debugging facilities, adding XCMDs and XFCNs, the dBASE-like programming language, System 7 compatibility, full file and

FoxBASE+	Add Data	Change data in an indexed field	Large non-indexed search & subtotal
4D			130
Omnis 5			
Double Helix			1,230
	5 10 15 20 25	4 8 12 16 20	20 40 60 80 100

As MacUser said, with FoxBASE+/Mac "data handling is extremely fast."

record locking in the multi-user version, and how FoxBASE+/Mac is "so astoundingly fast for a Mac."

Everyone seems to be laughing more now, too.

Call 1-800-837-FOX2 or 419-874-0162 today for a free, full-featured demo.

(Ask for Offer MUS-1201)

FoxBASE+/Mac ™

Resolve

An elegant interface and accessible 3-D-charting features make Claris' new spreadsheet program a top contender for first-time and casual users.

Claris Resolve is an elegant spreadsheet program that provides depth and versatility enclosed in a superbly crafted interface. Experienced users may find Resolve lacking in some sophisticated features found in Excel 3.0, but most first-time and casual spreadsheet-program users will find Resolve's interface less imposing than Excel's, especially when it comes to charting functions. Another noteworthy feature is Resolve's scripting language, which offers developers a smoother and more conventional route to customizing applications than Excel 3.0's macros do.

It's All in the Presentation

Claris gained a leg up on the development of Resolve by using the ready-made powerful spreadsheet engine from another Mac program, Informix's WingZ. However, Resolve's look and feel is uniquely its own. To a large extent, the program's strength lies in its presentation quality: Resolve presents users with a well-designed interface that allows them to create attractive worksheets and charts with a modicum of hassle.

With this in mind, it's not surprising to find a MacDraw-like palette of drawing tools at the left edge of each Resolve worksheet. The primary palette provides fast access to a selection pointer and line, arc, and polygon tools. Beneath it, there's a paint bucket for controlling the fill color and pattern of cells, and pen tools for defining the color and thickness of cell-division lines. In the bottom left corner of the program's window are zoom controls that allow you to magnify and reduce the worksheet view. You can also opt to hide Resolve's palettes if you want to enlarge your work area.

The palette creates easy access to many of Resolve's most commonly used functions, making it a more or less one-step process to add elements such as text fields, buttons, and charts to worksheets. The text and button tools are especially useful. With the text tool, you can place a block of text anywhere in a Resolve

worksheet and then give it a title and scroll bars, using menu selections. You can also assign format settings and a variety of text characteristics, such as fonts, sizes, and colors. Unfortunately, Resolve lacks the style sheets that make formatting Excel 3.0 worksheets such a breeze.

Once you've drawn a button on a worksheet, you can make it transparent and change its color and pattern. You use buttons to execute Resolve scripts, which are a distinguishing feature of Claris' new package.

3-D Charting

WingZ was the first Mac spreadsheet program to offer 3-D charting, so Resolve's robust charting features, which rival anything in Excel 3.0, are no surprise. What sets them apart from those of Excel is their relative ease of use.

Once you've created a default chart, you simply double-click on it to bring up the program's well-designed Gallery dialog box. From there, you can choose from

among 25 different charts and apply the selection to your chart. Resolve supplies a wide variety of chart types, including standard bar, line, area, and pie charts. Its 3-D chart types include contour, surface, and wire frame. You can even create combination charts and set up multiple axis scales, including linear, percentage, and logarithmic.

Double-clicking on the legend box in the default chart is one of several shortcuts to the Chart Options dialog box, which lets you specify chart ranges, legends, and titles. If you've ever struggled with the series labels in Excel, you'll appreciate how simple it is to set the series and division labels in Resolve.

In addition, Resolve's 3-D Options dialog box makes relatively short work of adjusting the rotation and elevation of 3-D charts. An Apply button lets you experiment with perspective settings before you finalize them.

A Set Chart Template command lets you tweak complex 3-D-chart settings and then create charts from several blocks of data, using the same settings. You can also copy one chart's settings and paste them into another. Ideally, we wish it was possible to name chart settings and apply them as style sheets.

Resolve Script

Resolve Script, Resolve's comprehensive programming language, lets you create scripts that attach specific operations to

Claris' new spreadsheet program, Resolve, offers a well-balanced mix of ease of use and power. To the left of each worksheet is a MacDraw-like tool palette. Under the hood, a robust scripting language provides developers with a sophisticated development environment for customizing applications.

buttons, text areas, and worksheets. You can also create stand-alone scripts that can be loaded and used by multiple worksheets. Resolve's scripting language also applies to the creation of functions that are capable of performing calculations.

To take some of the drudgery out of creating scripts, Resolve's Learn mode can automatically record your actions and then make the resulting code available for editing.

For more ambitious scripted applications, Resolve Script provides commands for creating sophisticated graphical elements such as dialog boxes, menus, number wheels, and slide bars. Unfortunately, Resolve doesn't provide a graphical editor, as Excel 3.0 does. You're forced to slug it out, using code, and you have to set up every menu item procedurally.
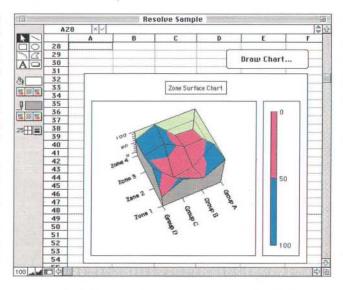
Nevertheless, Resolve's attached scripts are much less clumsy to use than Excel's attached macros. Moreover, Resolve's line-oriented scripting language and scripting editor will feel a lot more comfortable to developers used to conventional programming languages, such as C and Pascal, as well as to developers familiar with HyperCard scripting.

Despite its elegant interface and powerful scripting language, however, Resolve doesn't offer the same fine-tuned functionality you get with Excel. Excel provides split screens, for example, whereas Resolve is limited to locked titles. Excel's Calculate Now command allows users to convert a cell formula to a value before accepting it; Resolve lacks this feature altogether.

In addition, Resolve's Insert command pushes cells only to the right. To shift cells down, you must insert entire rows, which can be problematic if you're working with complex worksheets.

Worksheet linking is also more refined in Excel. Excel lets you create external references to cells in other worksheets by simply selecting the worksheet and pointing at the cell. With Resolve, however, you must explicitly type the reference. Moreover, to use a range name from another worksheet, you'd better have a crib sheet ready. Resolve doesn't provide feedback on the number of rows and columns in selected ranges, which Excel does.

On the other hand, Resolve liberates users from some Excel tyrannies. The Cut and Copy commands in Resolve are real Cut and Copy commands: You don't see any marching ants surrounding a selected

Resolve's 3-D-charting features are every bit as powerful as those of Excel, but Resolve users will find it less of a struggle to manipulate chart elements.

range on a worksheet. So when you copy or cut a selection and then decide that you want to insert a few rows, you can do so without losing the Clipboard selection.

Although Resolve takes special care to address the needs of novice users, even more-experienced users will appreciate small touches such as the Auto-Save option: To protect users from themselves, Resolve can back up worksheets automatically. You need only specify a name for each backup file and an interval for how often files are to be saved.

Resolve supports a wide variety of file formats, including Excel 2.2, WingZ 1.0, WKS, WK1, DIF, and SYLK for importing and exporting data. However, it doesn't do an adequate job of accepting Excel 3.0 files.

Resolve is a System 7-savvy application, and as such, it supports publish-and-subscribe, Apple events, and Balloon Help. The program requires System 6.0.2 or later and runs on any Mac equipped with at least 1 megabyte of RAM. Installing the full set of Resolve files requires 5 megabytes of disk space.

The documentation is well organized and clearly written, and the program's on-line, context-sensitive help is excellent.

The Bottom Line

Resolve reflects the Claris commitment to uncluttered and nonintimidating software. But that's not to say that Resolve lacks power and sophistication. Although it may not offer the same polish and depth of the Mac's more established spreadsheet program, Excel 3.0, Resolve's charting features and its scripting language add up

to a formidable challenge to Excel's domination of the Macintosh-spreadsheet market.

Resolve's interface will feel like an old friend to users of other Claris programs. Its use of a MacDraw-like palette of tools to the left of each worksheet is a particularly nice touch that makes fast work of adding graphics and text to worksheets. However, Resolve's palette can't compete with Excel's tool bar for convenient access to common spreadsheet functions.

If you're a first-time user looking for a spreadsheet program that will suit your needs both now and in the future, Resolve is well worth considering. It's more accessible than Excel for entry-level users, but it's guaranteed to hold up when you're ready to make full use of more-advanced spreadsheet functions.

Moreover, if you're a developer still unwedded to the ways of Excel, you'll do well to take Resolve for a spin. Resolve Script is a robust yet comfortable development environment that offers an attractive alternative to Excel 3.0's cumbersome macros.

— Louis E. Benjamin, Jr.

Get Info

Resolve
♦♦♦♦½
Published by: Claris Corp., 5201 Patrick Henry Drive, Santa Clara, CA 95052; (408) 727-8227.
Version: 1.0.
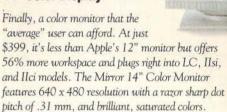**List Price:** $399.
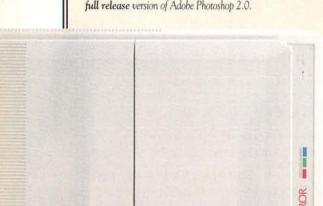
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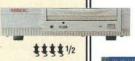
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Upfront

Alias' 3-D architectural-sketching program suffers from poor interface design and lacks some essential tools.

Alias' Upfront is a 3-D architectural-sketching tool for conceptual design. Rather than use wire-frame mode, users can draw colored shaded objects directly in a 3-D perspective view. Unfortunately, Upfront makes the modeling process a time-consuming chore that may be frustrating enough to drive some designers back to their mechanical pencils and drawing tables.

Interface Handicaps

Upfront's complex interface takes some studying to master, and many tasks require more steps than are necessary. In addition, Upfront lacks some important features of competing products such as Virtus WalkThrough (see review, July '91, page 72), Paracomp's revamped ModelShop II, and Dynaware's DynaPerspective.

In addition to using perspective view, you can also create elevation and floor-plan views and draw in them as well. A real disadvantage, however, is that Upfront displays only one window at a time, which is a handicap if you want to compare an object from different angles or have more than one file open.

Upfront's strength is that it allows you to draw objects perpendicular to any plane, including a tilted plane. You can lock on to any surface, line, or point and begin drawing at an angle. Unfortunately, Upfront uses the same convoluted method

for simple drawing tasks that it uses for drawing at angles.

The program's tools are kept to a manageable number, but it's not always easy to decipher their function by looking at their icons. Moreover, some basic tools don't work the way they should. Drawing a simple box, for example, takes seven mouse clicks. Moving objects also takes more work than is necessary.

Upfront also abandons all conventional Mac zoom operations. Instead of a zoom button, Upfront uses a complex multistep procedure that again involves extraneous mouse clicks.

Even printing involves an unconventional process. Upfront doesn't use the standard print-preview window that shows you how your drawing will fit on printed pages. Instead, you click on a Calculate button in the Print screen and a message tells you how many pages your drawing requires. As a result, the process of getting a drawing to fit on a page is pure trial and error.

Like Virtus WalkThrough, in order to properly display in perspective view 3-D objects that intersect, Upfront requires you to edit the objects. But using the editing tool requires too many steps, especially when compared with its counterpart in Virtus WalkThrough.

Despite these shortcomings, Upfront handles some operations quite well. For

example, it does a good job of importing PICT files and scanned images for use as backdrops. Once the backdrops are in place, you can draw objects to match the perspective of the background image.

Solar Power
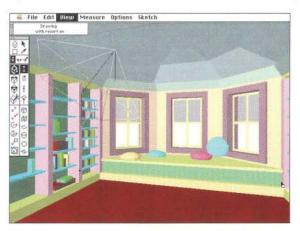
Another advanced feature is Upfront's ability to create shadows based on the position of the sun, which you can set for any place on earth at any time. Unfortunately, the sun is the only light source included with the program. Similar programs have multiple light sources and provide more controls over light color.

Also to its credit, Upfront's screen redraw is fairly snappy and the program offers solid import and export capabilities. You can export files in PICT, Illustrator, DXF, and EPS file formats. Currently, there's no support for Mac-RenderMan's RIB format, but Alias has promised this in a future version. You can also import DXF files, but this capability is not as useful as it seems, because you can use the files only as templates that you can draw on. Unlike with other 3-D modelers, you can't extrude a DXF floor plan. Because most walls are likely to be the same height, an extruded floor plan comes complete with all the walls drawn in, whereas in Upfront, you must draw each wall manually.

The Bottom Line

If you're looking for a versatile, well-designed software tool for creating 3-D architectural models, Alias Upfront is not the best choice. Compared with competing modeling programs such as Virtus WalkThrough and ModelShop II, Upfront has fewer features and it doesn't follow Macintosh interface conventions, making it harder to learn and use. As a result, it will take a major revision of Upfront before we can recommend it for conceptual design.

— John Rizzo

Alias Upfront is a 3-D architectural-sketching tool that's marred by an unwieldy, unconventional interface. As with many of the program's operations, creating new views is nonintuitive, requiring you to make umbrellalike structures such as the one shown here.

Get Info

Upfront

♦♦½
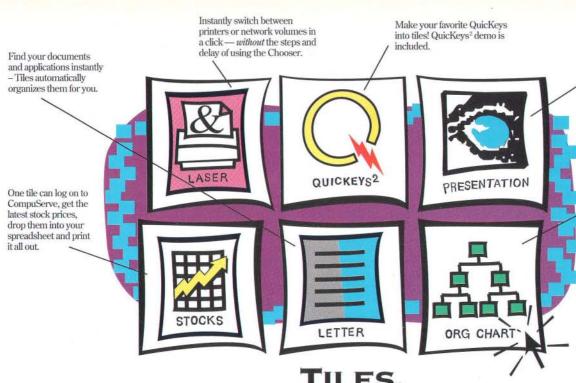
Published by: Alias Research, Inc., 110 Richmond Street E., Toronto, M5C 1P1 Canada; (416) 362-9181.
Version: 1.01.
List Price: $895.

GRAPHICS & DESIGN

ModelShop II

If you're looking for a soup-to-nuts 3-D architectural modeling tool, ModelShop II is it.

Paracomp's newly rewritten Model-Shop is one of the most complete 3-D architectural-modeling packages available. ModelShop II's list of features contains just about everything you can ask for in a 3-D-modeling environment, including unlimited layers, Bézier walls, text, measurements, rendering, multiple light sources, and animation.

A Matter of Perspective

Like Alias' Upfront, ModelShop lets you draw in 3-D perspective. But Model-Shop makes much less work of the process than Upfront does. Rather than making you define a plane every time you draw an object as you must with Upfront, Model-Shop lets you assign working planes to layers and views, switch planes, or create new ones at will. Furthermore, when you're editing objects, you don't have to worry about planes at all, because ModelShop lets you select and edit any object whenever you want.

ModelShop also supplies some handy tools for viewpoint positioning. The walk tool lets you take a mouse-operated walk through your model that's similar to Virtus WalkThrough's, although Model-Shop's speed makes this practical for wire frames only. ModelShop also gives you a slick way to navigate through your model or move light sources, using your keyboard's arrow keys.

Other noteworthy features are pop-up menus, automatically created keyboard commands for new views, and a library full of parts. In addition to objects, the library can store views, lighting setups, and even settings for grids and tools.

One big disappointment is ModelShop's method for creating holes in walls. You can create holes only on the working plane on which the wall was created, a restriction that makes hole punching a somewhat convoluted process.

One of ModelShop's most noteworthy features is its CAD connection. Most 3-D modelers use the standard DXF file format to exchange files with CAD packages. Unfortunately, DXF doesn't keep all file information intact, making for a decidedly poor interchange format. ModelShop II supports the ClarisCAD format, which retains more of the original file information. It also supports DXF.

Accuracy is also important for CAD applications, and ModelShop makes it easy to create models that are accurate to within a fraction of an inch. The x, y, and z coordinates display absolute coordinates (from 0,0,0) when you're selecting and relative coordinates when you're drawing. You can set x, y, and z to snap at whole or fractional intervals, and you can enter distances in decimals, even when the display is set to fractions.

Unlike other modelers, ModelShop

doesn't require special procedures for rendering intersecting objects. Intersecting polygons appear realistic without any user intervention and are accurate to the pixel level. Realism is enhanced by ModelShop's unlimited number of light sources, including a sunlight source. Because ModelShop interacts with Apple's Map control panel, you can apply the correct sun angle for the city where your model is located.

Animation is easy in ModelShop. You simply set up several views, and the program tweens between them. You can animate lighting as well to simulate how your model will look at different times of the day. The program's QuickPics utility lets you create stand-alone run-time versions of your animations. You can even attach sound for really snazzy demos.

For truly professional presentations, you can export your models to MacroMind Director via the Swivel export format. Imported PICT images can be used as background scenery. In addition, version 1.5 of ModelShop, which is due in January, is expected to include a direct export facility to a high-end rendering package as well as a video driver. The current version of ModelShop, version 1.2, is 68040- and System 7-compatible.

The Bottom Line

If fast visualization is your primary concern when it comes to 3-D architectural modeling, Virtus WalkThrough is your best buy, especially considering that since our last review, Virtus has reduced WalkThrough's price to half the price of ModelShop II. However, of the two, ModelShop is the more well-rounded product, packing in more practical and useful features than any other modeler. If you require a high degree of accuracy for your models or have plans to exchange files with CAD software, ModelShop II is the way to go.

— John Rizzo

Modelshop II is a 3-D architectural modeling tool that combines easy-to-use drawing tools with an impressive variety of powerful features. Here, the program's dithered shadows and multiple light sources create sunlight that streams through the windows of the model.
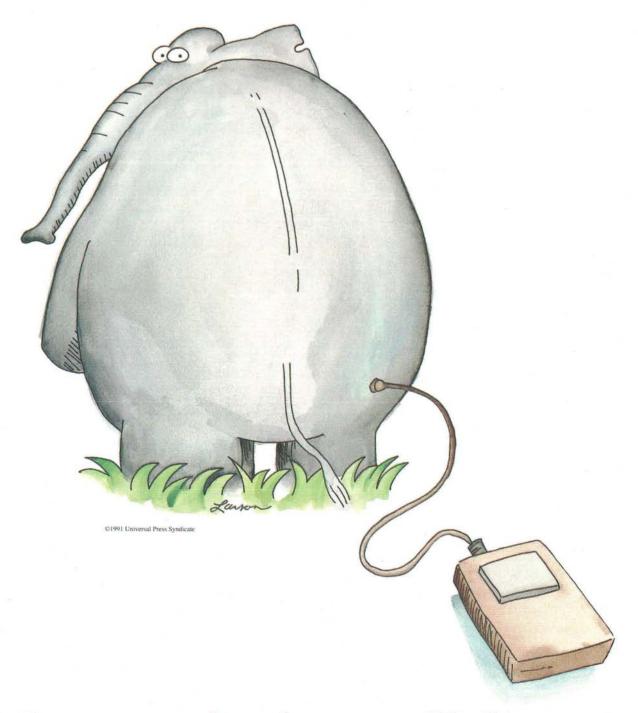
Get Info

ModelShop II
♦♦♦♦½
Published by: Paracomp, Inc., 1725 Montgomery Street, San Francisco, CA 94111; (415) 956-4096.
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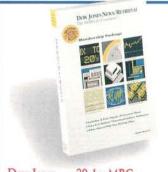
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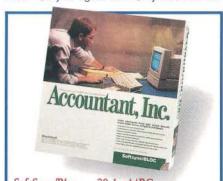
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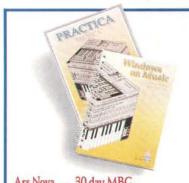*19" SuperMatch Monitor & Spectrum/8 Card*—Spectrum/8 cards run accelerated color graphics on affordable 19" SuperMatch color display.
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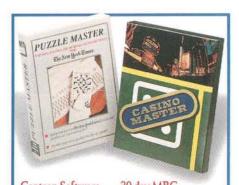
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1168	MX2400R Modem *(w/❼QuickLink II)*	69.
1176	MX2400S Modem *(w/SendFax 9600)*	79.
2310	FX9624 Send/receive Fax/Modem	119.
3576	FX9624V Send/receive Fax/Modem	169.

Microcom ... 30 day MBG

❼ *CarbonCopy Mac 2.0*–A best value in remote control. Direct another Mac's screen, keyboard, & mouse from anywhere. Single user for remote access (2 copies req.); unlimited users for networks.
7459 *(single)* . . . **$59.** 1556 *(unlimited)* . . . **$179.**

1179	V.42bis Modem *(w/MacPack)*	139.
2311	V.32 Turbo Modem *(w/MacPack)* . .	419.
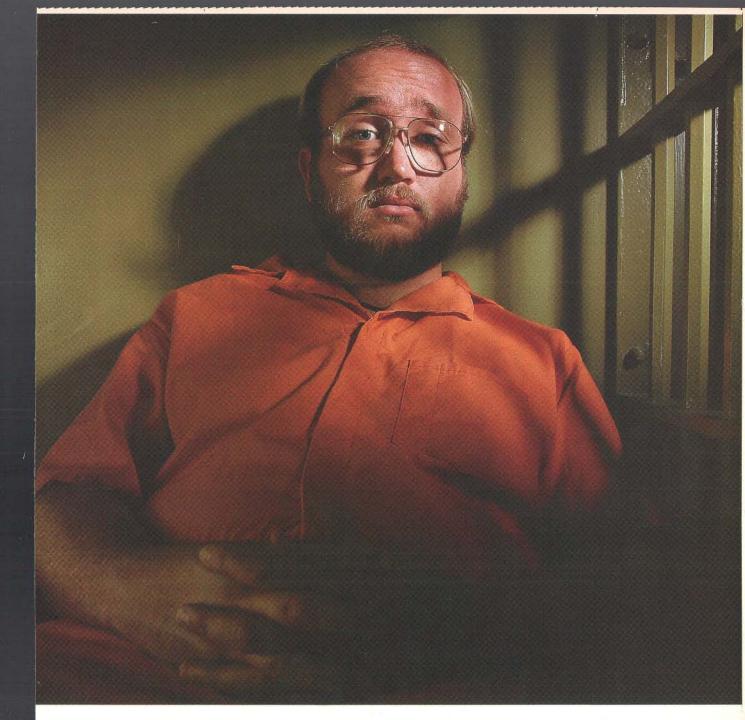
INPUT/OUTPUT
MONITORS, KEYBOARDS, MICE, PRINTERS & SCANNERS

★ Abaton ... 30 day MBG

7432	❼Scan 300/GS *(reqs. Scan Kit)* . .	999.
2742	Scan 300/Color *(reqs. install. kit)* .	1149.
1496	Int. Kit for 300/Color w/Photoshop	479.
1537	LaserScript LX	1729.

★ Advanced Gravis ... 30 day MBG

9963	❼Gravis Mouse Stick	59.
9964	❼Gravis Super Mouse	84.

American Power

5895	UPS 110SE	209.
6686	UPS 370ci	339.
3447	SurgeArrest Plus.	39.

★ Applied Engineering ... 30 day MBG

9799	❼Cache-In	199.

Caere

8124	❼Typist 1.1	479.
4476	❼OmniPage 3.0	495.

Software Ventures ... 30 day MBG

3455 ❼ *MicroPhone II 3.0*–(Free upgrade to 4.0) 1991 Macworld World-Class Award for *Telecommunications*. Build graphic front-ends to remote services and corporate mainframes. Top-selling telecom software . . . . **$215.**

"I am guilty of the ultimate crime."

Dear MacConnection,

I am guilty of the ultimate crime of ordering a product from one of your competitors. The hard drive I ordered from another*mail-order house works (so far) but the software I most wanted was not shipped to me. When I called to find out why, they said it was because the software would not be compatible with System 7.0, so they

did not include it as they had claimed they would. Nor did they have any intention of sending me a new version when it was 7.0 friendly. Disgruntled, I called you. The next morning, only 11 hours after I called, the product came and I have been completely satisfied. Thanks for being there when I needed you. Never again will I commit this

awful crime. From now on it is MacConnection or no connection!

Robert D Marvin

Bob Marvin
Dekalb, IL

MacConnection 1-800/800-3333 ®

800/800-4444.

Technology Works ... 30 day MBG
GraceLAN–Scan, report, and profile all software and hardware on every Mac on your network.
1582	*GraceLAN Standard 50 User*	$295.
1584	*GraceLAN Corporate Unlimited*	719.
1583	*GraceLAN 50 User Upgrade*	119.

Sigma Designs
1501	DoubleUp with ❼DiskDoubler 3.7	179.

★Total Systems ... 30 day MBG
7817	16 MHz Mercury 030 *(for Mac SE)*	359.
7816	20 MHz Gemini 030	799.
8371	40 MHz Gemini II 030	1459.
	68882 Math Coprocessors	call

ACCESSORIES

RIBBONS, CASES, DUST COVERS

Apple Computer
7748	Personal LaserWriter Toner Cart.	89.
1115	LaserWriter II Toner Cartridge	105.

★Avery ... 60 day MBG
4807	Laser Labels 1" x 2⅝" *(Qty. 3000)*	24.
5392	Disk Labels 3½"-Laser *(Qty. 630)*	29.
1600	1st Impression *(desktop bindery)*	229.

★Basic Needs ... 60 day MBG
Full line of Dust Covers, Stands, etc. call

★Computer Coverup ... 60 day MBG
9501	Mac LC w/12" Monitor Cover	10.

CoStar
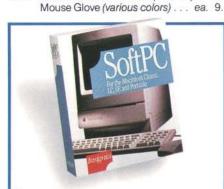|		
6091	The Organizer... 189. 7453 Jr.	82.

Global Village ... 30 day MBG
TelePort A300–1990 MacUser Editors' Choice Award for *Best Communications Product.* 2400 bps/MNP-5 modem connects via ADB Port. SendFax (9600 baud) optional.
8946 ❼*Basic*. $139. 8945 *with FAX*. $185.

★Curtis Manufacturing ... 30 day MBG
8046	MVP Mouse *(MVP-1)*	$89.

★Goldstein & Blair ... 30 day MBG
1913	The Mac Bible Guide to System 7	10.
8374	❼The Macintosh Bible *(with disks)*	25.

IDG Books
2238	Macworld Guide to System 7 Book	19.

★I/O Design ... 30 day MBG
8812	Ultimate Classic Carrying Case	64.
6129	Ultimate SE/Ext. Carrying Case	79.
1941	Ultimate LC Carrying Case	95.

★Kensington ... 30 day MBG
Full line available. Partial listing.
4973	Power Tree 20	27.
2573	Tilt/Swivel *(platinum)*	24.
2559	Apple Security Kit	33.
9303	Keyboard Shelf	39.
6763	SE Radiation/Anti-Glare Filter	52.
5064	Apple Color Monitor Polarizing Filter	63.

★MacConnection ... 60 day MBG
1505	Oak Disk Case *(36)* 21. 4623 *(90)*	32.

★Moustrak ... 60 day MBG
2694	Moustrak Pad *(7"x9")* 8. 2692 *(9"x11")*	9.
2693	Moustrak Pad Low Friction *(9" x 11")*	10.
	Mouse Glove *(various colors)* ... ea.	9.

Insignia Solutions
SoftPC–Software that runs MS-DOS applications on ANY Macintosh, and over a Novell PC Network! With SoftPC, your next PC could be a Macintosh.
9726 *Entry level SoftPC 2.5* .... $125.

★Sopris Softworks ... 60 day MBG
2009	Mac Classic Economy Case	49.

★Targus ... 60 day MBG
3617	Mac Classic/Plus/SE Case	59.
4015	Mac SE & Ext. Kybd. Carry Case	75.

STORAGE MEDIA

★Fuji ... 60 day MBG
2214	3½" DS Disks *(10)* 9. 2242 *(50)*	39.
2215	3½" HD Disks *(10)* 15. 2241 *(50)*	69.
2243	3½" DS Disks Color *(10)*	10.
2239	3½" HD Disks Color *(10)*	18.

★MacConnection ... 60 day MBG
6592	44 MB Cartridge 74. 9728 *(10)*	699.

★Sony ... 60 day MBG
3297	3½" DS Disks *(10)* 9. 6148 *(30)*	25.
3298	3½" HD Disks *(10)* 16. 6375 *(30)*	45.
8185	QD2040 Tape Cartridge	15.
1603	DG60M... 16. 2520 DG90M	27.

★3M ... 60 day MBG
3943	DC2000 40 MB Data Cartridge	18.

Hayes
8614 *Personal Modem 2400 Plus for Mac*–Everything you need to connect your Mac to the world of on-line information. Includes 2400 bps modem, Smartcom 1.0A, and phone and serial cables in one convenient, easy-to-use package. .... $149.

★MAXELL ... 60 day MBG
2792	3½" DS Disks *(10)*	11.
2793	3½" HD Disks 1.44 MB *(10)*	19.

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- No surcharge added for credit card orders.
- Your card is not charged until we ship.
- If we must ship a partial order, we never charge freight on the shipment(s) that complete the order (in the U.S.).
- No sales tax, except Ohio residents (please add applicable tax).
- All U.S. shipments insured; no additional charge.
- APO/FPO orders shipped First Class Mail.
- International orders U.S. $250 minimum. Manufacturer support and upgrade eligibility may be limited outside the U.S.A.
- Upon receipt and approval, personal and company checks clear the same day for immediate shipment of your order.
- Corporate P.O.s accepted subject to credit approval.
- COD max. $1000. Cash or certified check.
- 120 day limited warranty on all products. Defective software replaced immediately. Defective hardware repaired or replaced at our discretion. All items subject to availability. Prices and promotions subject to change without notice.
- Our order lines are open continuously from 8:00 a.m. Monday until 5:30 p.m. Saturday Eastern Time. You can call our business offices at 603/446-7711 Monday through Friday 9:00 a.m. to 5:30 p.m. Eastern Time.

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Continental US: Barring events beyond our control, all credit card orders phoned in weekdays by 3:15 a.m. Eastern Time will ship Airborne Express for delivery the next business day. Which means *same day* delivery for orders placed between midnight and 3:15 a.m. Eastern Time. (Some orders may ship by UPS Ground for next day delivery). Saturday delivery available to many areas upon request. Some areas require an additional day delivery. The total freight charge on any order placed with MacConnection is only $3.
Hawaii, Alaska, Canada, Puerto Rico and U.S. Virgin Islands: Call 800/800-4444 for information on shipping and charges.
All other areas: Call 603/446-7711 or FAX 603/446-7791 for information.

(There'll be no need.)

CoStar Corp.
1884	LabelWriter II.	$193.
1418	AddressWriter (Nov. '91)	499.
1885	☉Stingray ADB (platinum)	89.
2804	☉Stingray ADB (stealth black)	89.

★Datadesk ... 30 day MBG
9830	MAC101E Keyboard	129.
2384	MAC101E Kybrd. with QuicKeys[2]	149.
6901	Switchboard (modular keyboard)	159.

★Everex ... 30 day MBG
1144	☉Silhouette Trackball	82.

GDT Softworks
3429	☉BetterWriters 1.0 (software drivers)	39.
6256	☉PrintLink Collection/Serial 4.01	59.
6151	☉JetLink Express/Serial 2.1	89.

Hewlett-Packard
6514	HP DeskWriter (incl. cartridge)	569.
2964	HP DeskWriter (color, incl. cart.)	849.
9993	HP LaserJet IIIP (w/toner, reqs. kit)	1149.
6754	HP LaserJet III (w/toner, reqs. kit)	1679.

Hitachi
9492	14" Color Monitor (w/Mac II adaptor)	489.

★Kensington ... 30 day MBG
	☉Turbo Mouse 3.0 (Plus or ADB)	107.

Zoom Telephonics ... 30 day MBG
3576 FX9624 Send/Receive Fax/Modem–9600 bps send-and-receive fax and error-free data transmission speeds up to 9600 bps using V.42bis compression, V.42 and MNP 2-5 ...... **$169.**

Koala
2879	MacVision 1.1 (color)	409.

★Logitech ... 30 day MBG
1671	MouseMan	77.
5082	ScanMan Model 32 G-Scale Scanner	299.

★MicroSpeed ... 30 day MBG
2807	MicroTRAC (for SE & II family)	75.
6621	MacTRAC ADB 2.0 (SE & II family)	75.

★Microtek ... 30 day MBG
1981	MS-II OCR Scanner	849.
1978	Scanmaker 600GS	1199.
1985	Scanmaker 600ZS	1599.
1982	Scanmaker 1850S	2299.

Monster Design Group
1486	MacSpeakers (two, stereo)	169.

★Mouse Systems ... 30 day MBG
3005	☉A[3] Trackball (ADB)	79.
	☉Little Mouse or ☉Little Mouse Plus	74.

★Nutmeg Systems ... 30 day MBG
	☉19" for SE, SE/30, II, IIsi	ea.995.
	☉19" for GrayScale SE/30, II, IIsi	ea.1295.
	☉20" Color System: SE/30, II, IIsi	ea.2595.

★Orange Micro ... 30 day MBG
3036	☉Grappler 2.0 . 92. 6229 ☉LX	134.
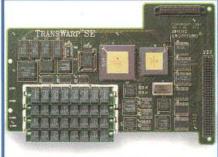
Sophisticated Circuits ... 30 day MBG
8009 ☉PowerKey 1.01–Turns your Macintosh and peripherals on from the keyboard and off with "Shut Down" .... **$64.**
8008 PowerKey Remote–Allows you to turn on your Macintosh with a phone call ...... 32.

★Sophisticated Circuits ... 30 day MBG
8009	☉PowerKey 1 01	64.
8008	PowerKey Remote	32.

★SuperMac Tech. ... 30 day MBG
1805	19" SuperMac Color Monitor	1999.

Thunderware
3108	☉LightningScan Compact	289.
4994	☉LightningScan 400	385.
3107	☉LightningScan Pro 256	519.

UPGRADES & DRIVES
MEMORY, ACCELERATORS

SIMMs ... with free video
8316	1 MB SIMMs (80ns, set of 2)	95.
9437	2 MB SIMMs for IIsi or II LC	99.

★Applied Engineering ... 30 day MBG
1971	FastMath LC	139.
8361	☉1.44 MB High Density Drive	229.
2532	QuickSilver (32K cache card)	309.
3319	TransWarp SE w/FPU (25 MHz)	829.
3317	TransWarp SE w/FPU (40 MHz)	1499.

★Dayna ... 60 day MBG
8722	DaynaFile II 1.2 5¼" Drive	449.

Applied Engineering ... 30 day MBG
TransWarp SE with FPU–Accelerate your SE to warp speed! 25 MHz or 40 MHz 68030, 68882 FPU, 32K Static RAM Cache, and 4 standard SIMM sockets to add up to 16 MB.
3319 25 MHz . **$829.** 3317 40 MHz . **$1499.**

★DayStar Digital ... 30 day MBG
Does not include optional math chip.
LT200 Connection (PC) 189. (MC) $299.
8556	☉FastCache for Mac IIci	279.
3401	☉FastCache for Mac IIsi	319.
3389	☉FastCache for Mac IIsi w/FPU	399.
	40 MHz PowerCache for SE/30, II, IIx, IIcx, IIci, IIsi, LC	949.
	50 MHz PowerCache for SE/30, II, IIx, IIcx, IIci, IIsi, LC	1689.
3584	DualPort IIsi (w/FPU)	165.

★Fifth Generation ... 30 day MBG
9403	JukeBox Five (auto disk feeder)	155.

★FWB, Inc. ... 30 day MBG
2320	HammerDisk44 (removable)	759.
2331	PocketHammer50	589.
2329	PocketHammer100	799.
2314	PocketHammer200	1249.
2341	Hammer50is (internal)	419.
2333	Hammer100is (internal)	629.
2334	Hammer200is (internal)	1049.

Iomega
2224	90 MB Transportable (reqs. kit)	799.
2467	Gold Std. Rem. Disk (90 MB, tri-pak)	439.

DayStar Digital ... 30 day MBG
DualPort IIsi Adapter–20 MHz math chip will make your data-intense applications fly while the adapter doubles the functionality of your PDS slot.
3584 DualPort IIsi w/20 MHz 68882 ..... **$165.**

Mass Microsystems
2605	DataPak (45 MB removable)	649.
2599	DataPak 88 Classic	899.
	Diamond 120-510 MB Hard Drives	call

★Micron ... 30 day MBG
7149	☉Xceed IIci-128K Cache Card	239.
6680	Xceed for SE/30 (640 x 480)	279.
2262	Xceed Color 30 Card (SE/30)	279.
2263	Xceed MacroColor II Card (Mac II)	469.

Peripheral Land, Inc. (PLI)
8335	PLI TurboFloppy 1.4	309.
8333	PLI Sony 40 Turbo Ext. Drive	419.
8327	PLI Infinity 40 Turbo	699.
9752	PLI Infinity 88 Turbo	849.
8330	PLI 105 MB Ext. Drive	649.
8329	PLI 200 MB Ext. Drive	989.
2327	PLI 2GB DAT Drive	2059.
2325	PLI Infinity Optical Drive	3199.
2644	Quantum 52 MB External	489.
1866	Quick SCSI Card	319.

PSI Integration, Inc.
3135	PSI MultiColor	99.
3137	Crunch-It! LC	113.
3141	Cache-It!	189.

Vellum 2.0

Ashlar adds features aimed at architectural designers to its powerful 2-D-CAD program.

Vellum 2.0 is the first major update of Ashlar's 2-D CAD program since its November 1989 introduction, when Vellum's ground-breaking smart cursor inspired a new generation of more accessible CAD programs. Version 2.0 incorporates new features for architectural designers as well as extended support for design exchange with other applications.

3-D Foundation

Vellum 2.0 contains the standard complement of 2-D geometric objects, including lines, double lines, arcs, circles, ellipses, rectangles, splines, polygons, and text. It also offers comprehensive editing and trimming commands as well as support for the ANSI Y14.5 drawing standard, a necessary requirement for most mechanical-drafting applications.

Although Vellum 2.0 is a 2-D-CAD program, one of its key strengths is the 3-D high-precision floating-point database that serves as its foundation. This structure will let Vellum easily incorporate 3-D design features in the future. The program requires a Mac with a 68020 or 68030 CPU, a floating-point coprocessor, 4 megabytes of RAM, and a hard drive.

New with Version 2.0 is an intelligent wall tool that automatically caps the ends of wall segments and trims or extends the intersections as necessary. The program is also capable of creating piping diagrams, extruded cross sections, and parallel-line geometry. New smart symbols, including doors and windows, automatically "break" or "heal" surrounding walls as you place or remove them.

Also new with version 2.0 are enhanced importing and exporting capabilities, including support for files in PICT, ASCII, IGES, and DXF formats. In addition, the program can export files in DXF, DXB, and EPS formats. DXB, the binary version of AutoCAD's DXF standard, produces files that are smaller than their ASCII counterparts. Support for this format should speed up the conversion process for Vellum users working with DXB-compliant programs.

Moreover, with version 2.0's ability to export EPS files, users can incorporate drawings into desktop-publishing or presentation documents without the loss of precision associated with PICT files. IGES support enables Vellum to communicate with high-end minicomputer, mainframe, and workstation-based CAD systems that don't support the DXF format.

For drafting environments that use Macs and PCs, Vellum offers the advantage of binary file compatibility over networks. The release of Vellum's Windows 3.0 version made the program one of the few multiplatform CAD applications. A version for Silicon Graphics' Personal Iris workstation may also be available by the time you read this.

To enhance graphics performance, Vellum 2.0 includes support for the Radius QuickCAD graphics accelerator. This is particularly important, because Vellum, unlike such QuickDraw-based graphics programs as Claris CAD and PowerDraw, relies on an imaging model that uses floating-point numerics and display-list processing. If you create large models or drawings, the Radius QuickCAD board is a real plus. Even better is the Radius Rocket accelerator card, which provides both a 68040 processor and the same display-list characteristics as the Radius QuickCAD board.
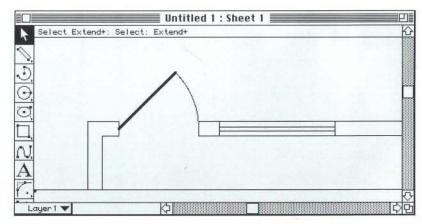
Smart Interface

Vellum is one of the easiest-to-use 2-D-drafting programs. Most users can learn the program's basic operations in less than a day, and if you use the program intermittently, you won't have to retrain yourself each time you use it.

All aspects of the program, including the creation and placement of dimensions, rely on the Drafting Assistant, an intelligent user interface that aids you in constructing and placing geometric objects. The Drafting Assistant makes precision drawing as intuitive as freehand sketching. This feature operates smoothly and effectively on all but the largest, most complex designs, where it can get overwhelmed with geometric feedback. Under such conditions, it helps to zoom in on drawing elements.

Vellum's use of integrated parametrics makes it possible to create designs without specifying exact dimensions. After you've finalized basic shapes and alignments, Vellum automatically adjusts drawings to match your specified dimensions. Vellum also provides a GD&T (geometric dimensioning and tolerancing) palette that's used to create GD&T symbols for mechanical drawings.

Another feature sure to pique the interest of mechanical drafters is Vellum's 2-D geometric analysis. You can easily and highly precisely calculate 2-D properties such as area, perimeter, weight, centroids, and moments of inertia.
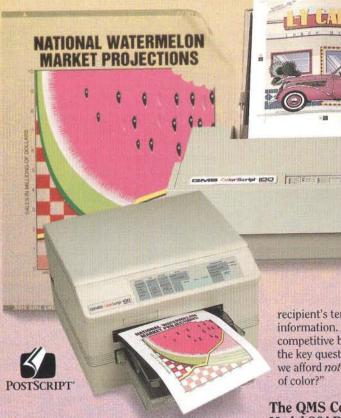
Vellum 2.0 is a powerful 2-D-CAD package based on a 3-D high-precision floating-point database. Version 2.0 includes extended support for new file formats as well as new architectural features such as the self-healing door symbol shown here, which automatically breaks or closes surrounding walls as you place or retrieve it.

Unlike most other 2-D-CAD programs, Vellum doesn't use a drawing metaphor for creating designs. Instead, it uses the concept of a model that can be depicted in any number of views — each of which can show additional detail. This method is particularly useful for showing enlarged or reduced views of objects.

Vellum supports standard Mac fonts and includes a plotter font. Pen plotting is controlled through a Chooser-level plotter driver that supports most common devices, including those from Hewlett-Packard and Calcomp.

The Bottom Line

Vellum 2.0, with its elegant and easy-to-use interface, is ideal for engineers and architects who occasionally require a powerful 2-D-CAD program. The Drafting Assistant operates smoothly and effectively but is less effective with large, complex designs.

With the release of version 2.0, Ashlar nearly doubled Vellum's price. The new price reflects more a change in marketing strategy than the addition of significant new features. In recognition of Vellum's unique functionality, Ashlar removed it from the retail channel and now offers it only through knowledgeable, authorized Ashlar resellers, a move that necessitated a price increase.

As a result, Ashlar has made it clear that if your needs require a simple 2-D-drafting solution, you're probably better off with a less expensive 2-D-CAD package such as Claris CAD or PowerDraw. Both are available at about half the price of Vellum, and both offer a smart-cursor feature.

However, what sets Vellum apart from lower-priced 2-D-CAD packages is its high-precision floating-point database, planned 3-D capabilities, parametrics, and multiplatform support. If these features are important to you, you'll find value in Vellum 2.0, despite its hefty price tag.
— James K. Anders

Get Info

Vellum 2.0
♦♦♦♦
Published by: Ashlar, Inc., 1290 Oakmead Parkway, Sunnyvale, CA 94086; (408) 746-3900.
Version: 2.0.
List Price: $1,995.

▮MULTIMEDIA

MediaMaker

MediaMaker helps you piece together multimedia presentations, but the results won't always be in sync.

Just as the desktop-video world turns to digital technology with Apple's pending release of QuickTime system software, MacroMind has released multimedia software aimed at analog video devices. Called MediaMaker, the software is designed for controlling, editing, and piecing together output from a variety of sources to create presentations.

In light of the QuickTime announcement, MediaMaker's timing may be less than ideal, and there are problems with the product's overall precision and accuracy. But if you're looking for a multimedia solution today, MediaMaker is it.

Tying It All Together

In addition to controlling external devices such as VCRs, videodisc players, camcorders, and CD-ROM drives, MediaMaker provides simultaneous control of Macintosh-based multimedia elements, including animation, graphics, and sound. It aims to make the integration of these elements relatively painless. After you've assembled a presentation, MediaMaker lets you send the results to videotape. With the right hardware, you can also use MediaMaker to overlay titles onto live video from a camcorder and record the results to a VCR.
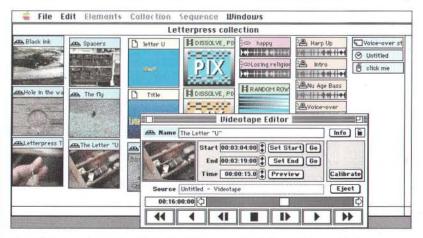
In fact, MediaMaker gives you a Mac-based video production system — almost. There's one caveat, however. Because the software is designed to work with consumer-level devices, it can't provide professional-level synchronization.

If you're serious about creating multimedia presentations with a Mac, get your wallet out. We teamed MediaMaker with a Mac IIx, an Apple 8•24 display card, two Apple 13-inch RGB monitors, a Sony videodisc player, a Sony 8-millimeter VCR and 8-millimeter camcorder, an audio mixer, speakers, a VideoLogic DVA-4000 digitizing/display board, a VideoLogic Mediator (a high-quality, easy-to-use Mac video-to-TV video-converter box), a CD-ROM player, and plenty of cables. This resulted in a $15,000-to-$20,000 system.

Although you can do simple cut-to-cut editing with a Mac Classic teamed with a camcorder, a VCR, and a TV monitor, you won't be able to take advantage of MediaMaker's special feature: mixing Mac elements with video clips.
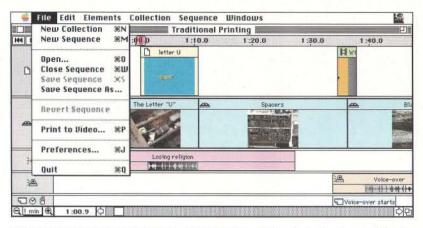
A MediaMaker element can be a clip

MediaMaker is not a multimedia authoring program, nor is it graphics or animation software. You use graphics software and external devices such as VCRs and videodisc players to create elements for presentations, which you assemble and edit from within MediaMaker. Icons representing each element help you arrange them for presentations.

The MediaMaker sequencer lets you arrange your elements for playback or for recording to videotape. PICONS stretch and shrink to show their relative playing time.

from a videotape or videodisc, a digitized Mac audio file, a color PICT file, an animation sequence, or an audio selection from a compact disc. You can't save the files themselves into MediaMaker, however. Rather, MediaMaker stores references that track the location and source of the files.

When you create an element, you determine how long it will play. For videotape and videodisc players, for example, you set a starting and ending point for a clip. To help you recognize and organize the elements you create, MediaMaker creates PICONs (picture icons) for each element. PICONs are 8-bit representations of actual images. Say you want to use a PICT image of flowers in your presentation. MediaMaker creates a low-resolution icon-sized version of the image. For video-clip PICONs, you need a digitizing board to digitize a frame of video. Elements such as CD-audio selections and digitized Mac sound files appear as rectangular icons that you can copy, drag, or paste. PICONs that represent video or audio sequences stretch and shrink to indicate their relative length of play.

To assemble a presentation, you use MediaMaker's collections and sequences. A collection consists of multiple media elements that you assemble into a sequence for playback.

MediaMaker provides plenty of flexibility for assembling presentations. First you must build one or more collections. You can click, drag, copy, and paste PICONs and icons within and between collections. Multiple collections can be open simultaneously. You can add comments to any PICON, but one drawback is that you can't search by keywords.

Although using collections is an easy way to assemble elements, MediaMaker would be greatly improved if it offered a more powerful archive-and-retrieve engine.

Probably the single most important MediaMaker feature is its control of video devices, and it's likely that many people will use the software solely to edit videotapes. The program controls devices through two serial ports, so you can control two devices at once.

MediaMaker controls devices through special software modules called XObjects, which you drag into MediaMaker's Extensions folder. The current release of MediaMaker ships with XObjects for video devices that use Sony's LANC communication protocol, meaning almost every Sony consumer camcorder and VCR. The LANC-to-serial connection allows the control of the tape transport of video equipment.

Notoriously Inaccurate

Unfortunately, MediaMaker is only as accurate as the devices it controls, and consumer videotape devices are notoriously inaccurate, because of tape slippage. In addition, MediaMaker tracks video clips in hours, minutes, and seconds, using the same counter used by camcorders and VCRs. This is not accurate control. You can get XObjects for more-accurate devices that use *time code* for control. Time code keeps track of video with exact frame numbers written onto the tape itself rather than with a hardware counter like those used in consumer equipment. The most recent version of MediaMaker supports time code, but that doesn't solve the synchronization problem.

After building a collection, the next

step in creating your multimedia presentation is to assemble its elements into a sequence. To do this, you drag the PICONs and audio icons from your collection into the desired order in MediaMaker's sequencer. As you play sequences, MediaMaker accesses the appropriate Mac files or shuttles to the appropriate clips on external devices.

But again, the synchronization problem rears its ugly head. In addition to the synchronization problems caused by consumer video equipment, there are also problems in getting all the presentation elements to appear in sync. If a selected video clip is at the end of a tape, for example, the VCR must fast-forward to the desired sequence. The Mac also takes a few seconds to access and display a full-color, screen-sized graphic. Large Mac audio files take several seconds to load. If you've arranged all these elements to play simultaneously, it's important that they start at the same time.

To compensate for this, MediaMaker can pause devices to allow other elements of a sequence to play in sync, but the results are far from accurate. We created a 2-minute sequence that included video clips, CD audio, Mac audio, and graphics. The resulting videotape, however, was 2 minutes, 11 seconds long. As you add more elements and longer sequences, the synchronization problem gets worse.

The Bottom Line

Despite these drawbacks, MediaMaker provides a convenient, albeit not completely accurate, method for producing multimedia presentations and editing videotape. Anyone trying to integrate media by using a Mac can quickly discover MediaMaker's benefits. If you plan the sequences properly and are willing to live with some inaccuracy, MediaMaker can be a useful tool.

— Paul Yi

UTILITIES

MasterFinder and Mr. File

MasterFinder succeeds where Mr. File fumbles in a bid to outdo the Mac's Finder.

For those who are tired of playing hide-and-seek with files and folders, two new utilities provide alternatives to the Mac's Finder for managing and finding files. MasterFinder is a well-conceived program that offers several advantages over even the new System 7 Finder. Mr. File, on the other hand, is a DA that's hard-pressed to compete favorably with the Mac's Finder under either System 7 or System 6.

MasterFinder

MasterFinder comes as both a DA and an application. The program's most outstanding interface feature is its use of four panes, each of which lists the contents of any folder, no matter where the folder is on the desktop. You open a folder by clicking on its listing in the pane or by selecting it from MasterFinder's dynamically updated pop-up menus, which have a list of recently opened folders (a function that's similar to that of Now Software's Super Boomerang). A pop-up menu accompanies each pane.

The result is a fast and convenient way to display and manipulate the contents of several folders at once. MasterFinder's approach successfully avoids the clutter and overlapping windows of the Finder and is even more flexible than System 7's new option for displaying the contents of multiple folders within a single window.

From MasterFinder's primary four-pane view, you can execute most functions associated with the Mac's Finder. You can launch, rename, copy, move, or delete files, and copy, erase, and eject floppy disks. MasterFinder also maintains a configurable Launch menu, similar to On Cue's and HandOff II's, for launching frequently accessed applications or documents. It's accessible, however, only when MasterFinder is the active application.

MasterFinder also provides launch overrides similar to those in HandOff, so double-clicking on a file icon opens the file in an application other than the one that created the file. This can come in handy if you want to open a MacPaint document with a graphics application other than MacPaint, for example. MasterFinder also has multicriteria file-search capabilities and a Get Info display, both of which compare favorably with similar functions in other file-management utilities.

Still more abilities are available in MasterFinder's other views. The Folder View is like the Finder's View by Name. The Internet View lists all available network zones and the devices connected within each zone.

MasterFinder's multiple views make it less intuitive to use than the Macintosh Finder. Although it won't take you long to master the program's primary functions, expect to spend some time learning its more subtle features.

MasterFinder's latest version, 1.2, offers several System 7-specific features, including support for Balloon Help and Apple events. It also provides Shut Down and Restart commands.
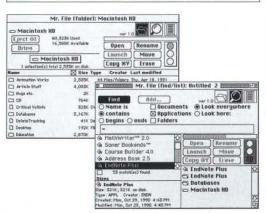
Mr. File

Mr. File's most useful feature is its ability to do file-management tasks in the background. Activities such as file searching and file copying can proceed while you keep control of your Mac, so Mr. File is ideal for users who frequently perform time-consuming operations such as downloading large files over a network.

Although System 7's Finder has a similar background-processing capability, it's not quite as versatile. Mr. File lets you set up other file-management tasks while one is in progress; the Finder can't perform any other Finder-related tasks if it's already processing a task in the background. On the other hand, because Mr. File is a DA, you can't use it to erase entire disks, as you can with the Finder.

Using Mr. File's selection windows, you can create lists that combine files from separate folders and then launch the files by clicking on them in the Selection List. Of course, System 7's Alias command accomplishes virtually the same thing, with less hassle. One Mr. File advantage, however, is that it can link selection

MasterFinder is a file-management utility that competes successfully with the System 7 version of the Finder. Its unique four-pane display of files and folders avoids the clutter and confusion of the Finder's overlapping windows.

Mr. File's approach to file management is less successful than that of MasterFinder. The chief advantage of Mr. File is its ability to perform file-management tasks, such as file searches, in the background.

windows to its Find function, and file-search results are automatically saved in the Selection List.

Mr. File has almost all the standard file-management functions you expect from the Finder, including the ability to launch, copy, rename, and erase. The most current version of Mr. File, version 1.1, is System 7-compatible, with support for 32-bit addressing and virtual memory.

The Bottom Line

System 7 users will find no advantage in using Mr. File over the new Finder unless they need to perform lengthy file-related operations such as file copying in the background. And even then, a hefty amount of RAM is required to deliver adequate performance, for both background and foreground operations. Softways' timing of the introduction of its file-management utility is unfortunate. Compared with the System 7 version of the Finder, Mr. File just can't compete.

MasterFinder, on the other hand, successfully combines the abilities of a slew of separate utilities — including the Mac's Finder, DiskTop, Super Boomerang, HandOff, and On Cue — into one conveniently organized package that presents a consistent interface for each file-management task. Although some users may understandably eschew MasterFinder's less intuitive interface in favor of the Finder's familiar iconic display and desktop metaphor, other users seeking a single general alternative to the Finder won't be sorry they chose MasterFinder.

— Ted Landau

Get Info

MasterFinder
♦♦♦♦
Published by: Tactic Software, 11925 S.W. 128th Street, Miami, FL 33186; (800) 344-4818 or (305) 378-4110.
Version: 1.2.
List Price: $99.

Mr. File
♦♦¹/₂
Published by: Softways, 5066 El Roble, San Jose, CA 95118; (408) 978-9167.
Version: 1.1.
List Price: $99.

Timbuktu and Carbon Copy/Mac

Timbuktu version 4.0 outmaneuvers Carbon Copy/Mac version 2.0 when it comes to features and performance in remote-control software, but Carbon Copy's price is hard to beat.

If you're a network-support person looking for a way to solve users' technical problems from your desk, not theirs, Carbon Copy/Mac version 2.0 and Timbuktu 4.0 have the answer. Both are remote-control packages that allow a Mac connected to an AppleTalk network — either LocalTalk, EtherTalk, or Token-Talk — to monitor and control other Macs on the network remotely, just as if the controlling Mac's mouse and keyboard were directly connected to a remote machine. In addition, both packages allow for error-free background file transfers between remotely connected Macs.

Timbuktu has the edge over Carbon Copy in features and performance, but Carbon Copy offers a decided price advantage. Priced aggressively at $299 for an unlimited number of Macs networked in a single AppleTalk zone, Carbon Copy is a bargain compared with the serial-number-protected Timbuktu, priced at $195 per node (with discounts for multiple copies).

Host Protection
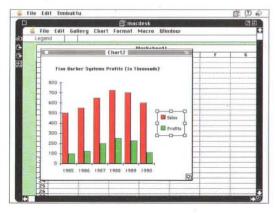
To protect access to host Macs (machines controlled remotely by other Macs, which are called guests) Carbon Copy and Timbuktu provide two levels of password protection. The first level controls access to the software's user-authorization screen, and the second supplies a password for each user who is allowed access to the host. The host computer may also limit guest operations to one or more of the following: controlling, monitoring, or transferring files.
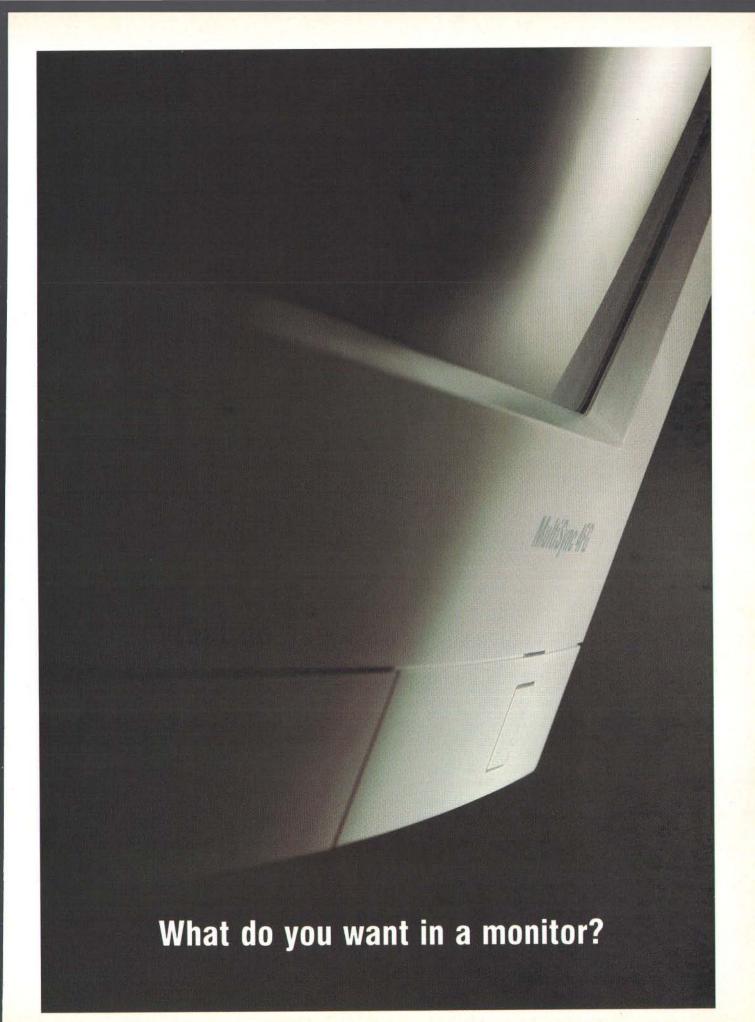
Carbon Copy and Timbuktu employ different screen techniques for handling host screens that are larger than those of guest computers. In such cases, Carbon Copy lets you move the host screen to the right by moving the cursor all the way to the far-right edge of the Carbon Copy window on the guest desktop. Timbuktu offers a more flexible and elegant approach that lets you move the screen as much or as little as you like.

Carbon Copy users can expand the host's desktop to replace their own, so the menu bar they're viewing is actually the host's menu bar. But they can do so only if the host screen is larger than that of the guest. Timbuktu, on the other hand, places no restrictions on increasing the size of host screens to replace guest screens. In addition to its screen-handling advantages, Timbuktu's interface is more graphical and easier to use than Carbon Copy's.
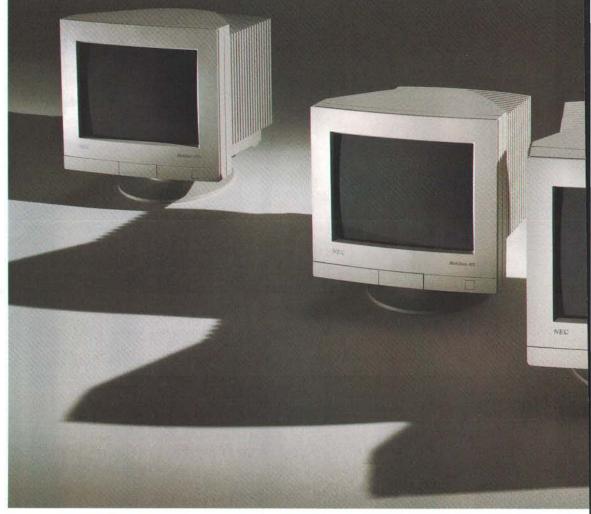
Another plus for Timbuktu 4.0 is its support for color screens, an option that's currently unavailable in Carbon Copy.

Timbuktu 4.0 is the only remote-control software that currently offers support for color-screen sharing. In addition, its screen-handling techniques and faster file transfers give it the edge over Carbon Copy in features, although users pay dearly for Timbuktu's advantages: Its price per node can be considerably higher than Carbon Copy's.

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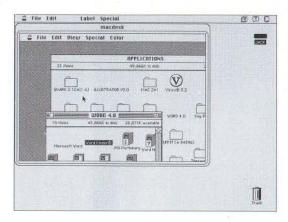
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Although its price is right, Carbon Copy's lack of color support can cause problems. Here, some colors on the host screen (the desktop activated by the visible cursor) have become invisible, causing several folder icons to disappear.

Two color Macs equipped with the 32-bit Color QuickDraw INIT and System 6.0.5 or later can share screens. However, we can't recommend color screen sharing on LocalTalk networks, because the performance is unacceptably slow.

Carbon Copy users may encounter an occasional problem with the program's black-and-white approach to color-screen sharing. Some light desktop colors can map to white, resulting in invisible objects on-screen. Carbon Copy addresses this problem by allowing guest users to switch color host screens to black-and-white on the fly.

One more screen-sharing feature for network environments provided by both Timbuktu and Carbon Copy is special software that allows a file server to be operated remotely, thereby eliminating the need for a costly monitor and video card on the server.

Another Timbuktu advantage is that it allows one guest to monitor or control multiple hosts, whereas a Carbon Copy guest is limited to monitoring or controlling one remote Mac at a time. Both products, on the other hand, allow multiple guests to observe a single host.

File Transfer

In addition to letting users share screens, Carbon Copy and Timbuktu allow them to transfer files between host and guest computers. System 7 also offers a way for networked Macs to share files without a file server by allowing users to set up a folder or disk that others on the network can mount on their desktops. Configuring and using Carbon Copy and Timbuktu's file-transfer capabilities is faster than using System 7's for file transfer in network-support environments.

Overall, our tests showed Timbuktu's file-transfer speed to be faster than Carbon Copy's by 30 to 50 percent. Carbon Copy

provides several useful features for file transfer that are missing from Timbuktu, however. For example, host users can disable file transfers to and from the System Folder. In addition, Carbon Copy users can transfer files in compression mode, a boon to dial-up transfers and an advantage on busy networks with limited bandwidths.

In addition to being available in network versions, Carbon Copy and Timbuktu come in single-user versions that allow for remote control over a serial-communications connection. Carbon Copy's single-user version is $99; Timbuktu/Remote's is $195. You can control your office machine from your home machine, for example, as well as transfer files. Both packages require a single-user version to be running on each computer.

One difference between the Carbon Copy and Timbuktu single-user versions is that Carbon Copy doesn't allow you to share screens with other nodes on the network once you've dialed in to your office machine. Timbuktu/Remote, on the other hand, allows you to share screens with and transfer files to and from other machines on the network that are running Timbuktu once you've connected to your office Mac.

Our tests showed that both Carbon Copy and Timbuktu run under System 7 without a hitch, although neither one takes advantage of System 7-specific features.

The Bottom Line

With its elegant interface design, color-screen sharing, and faster file transfers, Timbuktu is clearly the winner over Carbon Copy in performance and features. However, Timbuktu's features seem overpriced when compared with Carbon Copy's aggressive $299-per-zone pricing strategy. On a 250-node EtherTalk zone, for example, Carbon Copy's cost is $299, whereas Timbuktu's is a whopping $12,500, even with Farallon's quantity discount. Clearly, if users can live with basic screen-sharing capabilities, Carbon Copy offers a solid value.

— Jeffrey A. Steinberg

Get Info

Carbon Copy/Mac
‡‡‡½
Published by: Microcom, Inc., 500 River Ridge Drive, Norwood, MA 02062; (800) 822-8224 or (617) 551-1000.
Version: 2.0.
List Price: $299 per AppleTalk zone; $99 per user.

Timbuktu
‡‡‡‡
Published by: Farallon Computing, 2000 Powell Street, Suite 600, Emeryville, CA 94608; (510) 596-9000.
Version: 4.0.1.
List Price: $195 per node; quantity discounts available.

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EDUCATION

Health: AIDS and GTV: A Geographic Perspective on American History

Two interactive videodisc packages take widely differing approaches to combining the Mac with educational videodisc material.

Health: AIDS and GTV: A Geographic Perspective on American History, two interactive videodisc packages designed for educational use, combine the Mac, a videodisc player, and a TV. The GTV package, from the National Geographic Society, is targeted at elementary or junior-high-school students and offers a somewhat limited approach to interactive video. On the other hand, Health: AIDS, a package for junior- and senior-high-school students produced by ABC News Interactive, makes good use of the Mac/videodisc combination.

Interactive videodiscs aid the learning process by involving students with the material at hand and by making large amounts of information accessible. A well-designed package requires users to select the topics they want to explore and allows them to pursue information in an order they feel comfortable with, rather than one preordained by an instructor.

The Health: AIDS and the GTV packages comprise both videodiscs and floppy disks. To set up an interactive-video workstation, you simply connect a Mac to a videodisc player equipped with a serial port. The videodisc player, in turn, is connected to a television monitor. Each package provides HyperCard-based software that serves as the navigation tool for the stacks and the short video segments compiled on-disc.

In general, because the HyperCard interface is displayed on a computer monitor while the videodisc output is viewed on a television, one distinct drawback of interactive videodisc packages is that the setup requires you to switch your viewing position frequently between the two displays.

Health: AIDS

The Health: AIDS package is organized into two parts, each of which corresponds to a side of the videodisc. The first part is divided into three main topics: Facts and Fiction, How HIV Is Transmitted, and AIDS and Society. The second part consists primarily of interviews and related material.

Clicking on a main topic takes you to a list of subtopics, each with a brief descriptive summary. Clicking on bold-faced words within the summary opens a glossary where those terms are defined. You can also select video options, such as a brief discussion of AIDS by former surgeon general C. Everett Koop. You may play the entire video segment or select from among several video-clip excerpts. For the interviews, you can even select particular questions you wish to hear answered. In all cases, you can stop, pause, or rewind the video at any point. Other video support materials include graphs and statistical summaries. As video segments are playing, you're able to retain

The Health: AIDS interactive videodisc package makes good use of the Mac and the accompanying videodisc to teach about AIDS. Here, the opening screen for a question-and-answer session with four AIDS patients lets you select each interview individually.

total control of the Mac, so you can move to other cards or select other options.

The Health: AIDS HyperCard stacks are worth exploring even without the accompanying videodisc. They contain a wealth of information organized and interconnected in typical button-clicking hypertext fashion. The video segments

Graphs
Total U.S. Population

More of us with every decade. Though the occasional war has its bloody effect—click "War Fatalities" for the sad facts of the matter....

1790
1840
1870
1890
1910
1920
1950
1980

0   50   100   150   200   250

In millions (rounded to the nearest 2.5 million)

WAR FATALITIES

GTV: A Geographic Perspective on American History falls short in its use of the Mac teamed with a videodisc player to present educational material. Interaction with the package's HyperCard-based software is limited, although you can do things such as click on a bar of the population graph shown here to display corresponding numerical data.

become just one of several options, enhancing the overall effect rather than being the central focus of it.

Overall, the package is quite engrossing. Initially, most users are likely to spend time browsing through the video segments, especially the interviews. But once you've gone through the entire package, you will definitely have learned a great deal about AIDS.

The well-written documentation includes a guidebook to help teachers develop lesson plans. If you're technically inclined, you can create customized presentations by editing video segments, determining the order in which they are to be played, and combining them with your own audio input or video captions.

GTV: A Geographic Perspective on American History

The GTV package covers American history from pre-Revolutionary War colonization to the present. The videodiscs are divided into a series of brief segments, each on a separate historical topic. GTV's

How to be social.

Think how much more effective your people would be if they could communicate better. That's the idea behind WordPerfect Office™ 3.0 for the Macintosh.

It's actually several programs in one. WordPerfect Office comes with a very versatile E-mail package (WordPerfect Office Mail™), that makes it easy for people on a

Macintosh network to keep in touch. The mail screen shows you everything you need to compose and circulate messages to an individual, to a group, or to the entire corporation.

With Mail, not only can you send and receive messages, but you can also attach up to 100 files of any format. Beyond that, you can add sound or voice annotation, broadcast

a message to anyone logged onto your network, or send carbon and blind copies.

Ever wish you could take back your words? Mail's unique status tracking capabilities let you know when a message has been delivered or opened. So if a message hasn't been read yet, you can retract and edit it.

Directory lists the titles of all the video segments, categorizing them by date, theme, keyword, or pictures. GTV's Activities option purports to be the most interactive part of the package. You can, for example, click on a map of the U.S. and view a video segment that describes the selected geographic region.

Control over playing, stopping, or rewinding video segments is similar to that of Health: AIDS. However, the GTV package's drawback is that while a video segment is playing, you can't access nonvideo functions on the Mac. In addition, although GTV allows you to create custom presentations, it provides no options for adding sounds or video captions.

Overall, the GTV package is not the most effective example of interactive video. Basically, it relegates the Mac to the role of a simple fast-forward control. Even exploring the videos gets irritating, because the subject matter is spread over two discs, which necessitates frequent swapping and flipping of discs if you're pursuing the material in a nonchronological fashion. Moreover, the GTV videos rely almost exclusively on still images, even when discussing events of the last few decades.

The Bottom Line

Both Health: AIDS and GTV: A Geographic Perspective on American History succeed in delivering audiovisual material that's informative and interesting. However, ABC News Interactive's Health: AIDS package outshines the GTV product in its use of the controlling HyperCard-based software. The GTV package is primarily a pair of videodiscs that uses the Mac as a front end for selecting video segments, whereas the Health: AIDS package goes one step further to make better use of the Mac both as a controlling device and as a source of data that's well integrated with the material on videodisc. The package may not succeed in pushing interactive video into the mainstream, but it's decidedly moving it in the right direction.

— Ted Landau

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TEXAS INSTRUMENTS

POWER CACHE PowerCache IIci
★★★★½

For Mac IIci owners looking for a way to boost their machine's performance, the PowerCache IIci accelerated cache card from DayStar Digital comes close to doubling the speed of the IIci under some conditions.

The Mac IIci's main performance bottleneck is slow memory, because the CPU must wait every time it requests application code or data from the motherboard's relatively slow 80-nanosecond dynamic memory. A cache card can improve performance by storing frequently used data on the card's faster cache memory, thereby minimizing wait states (see "High-Speed, Low-Cost IIci Cache Cards," June '91, page 124).

For an even greater performance improvement, DayStar's PowerCache IIci goes one step further than standard low-cost cache cards by using a faster processor instead of the Mac IIci's stock 25-megahertz 68030.

The PowerCache IIci is available in four configurations. All models contain a 32K cache of 20-nanosecond direct-mapped static RAM accelerated by either a 40-megahertz or a 50-megahertz 68030 CPU, optionally paired with a 68882 FPU (floating-point unit) of the same speed. The optional FPU is helpful for applications, such as CAD, 3-D rendering, and financial modeling, that require complex math calculations.

The PowerCache itself is a full-height card that plugs in to the Mac IIci's 120-pin cache slot, leaving all three NuBus slots free for other cards. You set its various options via a control panel, and you can turn the device's 32K external cache on and off at will. Its Writeback Buffer lets the CPU write data to the card's on-board memory instead of to the motherboard, thus freeing the CPU to perform other tasks.

The card's PowerMath option traps application calls to SANE (standard Apple numeric environment) and routes them to the 68882 math chip, positioned either on the PowerCache or on the Mac IIci motherboard.

To test the PowerCache's performance, we ran the four benchmark tests used for the June '91 lab report about cache-only cards. The specific speed improvement depends on the application, but overall, the 40-megahertz PowerCache boosted the IIci's performance by 47 percent and the 50-megahertz PowerCache with FPU challenged Mac IIfx performance with a 72-percent speed improvement over a stock IIci. By comparison, the eight cache-only cards included in the June lab report (with an average street price of $250) improved overall IIci performance by only 30 percent on average.

DayStar claims that a new version of the PowerCache, which will be available by the time you read this, offers even faster performance, providing a 100-percent speed improvement over a stock IIci and competing favorably with 68040-based accelerator cards. Because it's a 68030-based card, however, the PowerCache will not suffer from the software-compatibility problems that plague 68040-based machines.

The PowerCache IIci cards are backed by a one-year warranty, a 30-day guarantee, and toll-free technical support. Their only drawback is that they're a bit pricey when compared with cache-only cards on a bang-for-buck basis. DayStar's normal "no fault" upgrade program lets you trade up to faster cache cards for the difference in list price. If you upgrade from the $379 FastCache cache-only card to the 50-megahertz version of the PowerCache, however, you get double credit ($758) toward the price of the PowerCache. For this reason, we recommend that you start with a FastCache and then move up to a PowerCache if you decide you need a bigger performance boost.
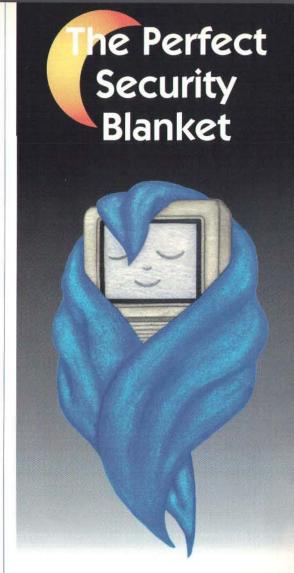
DayStar Digital, Inc., 5556 Atlanta Highway, Flowery Branch, GA 30542; (800) 962-2077 or (404) 967-2077. Version 1.0.4. 40-megahertz CPU without FPU, $1,299; 40-megahertz CPU with FPU, $1,599; 50-megahertz CPU without FPU, $2,299; 50-megahertz CPU with FPU, $2,699.

— Owen W. Linzmayer

Dr. T's Intro+
★★★★

If you're a MIDI keyboarder who's having trouble digesting the ins and outs of MIDI sequencing and notation, Dr. T's Intro+ MIDI starter pack may be the prescription for your musical maladies.

Several MIDI-software makers, including Opcode Systems and Passport Designs, offer entry-level products, but

Dr. T's Intro+ bundle stands out from the crowd. It includes Dr. T's Beyond sequencing software, Great Wave Software's Music Writer 5.2.1 notation program, two MIDI cables, and an Altech 1-in 3-out MIDI interface.

Overall, the Intro+ package is a good value but with one caveat: It bundles the outdated version 1.6 of Beyond. To upgrade to the far superior Beyond 2.0, Dr. T charges an additional $40. However, what you get for that $40 is well worth the money: event-list editing, MIDI Manager compatibility, real-time editing, and support for Mark of the Unicorn's MIDI Time Piece. We highly recommend upgrading to Beyond 2.0.

Far from being a stripped-down MIDI sequencer, Beyond 1.6 distinguishes itself from other entry-level products by bridging the gap between beginner-level and professional sequencers, so it can continue to meet your needs as your MIDI expertise grows.

Beyond provides graphic editing, track looping, and record filtering of controller information and has the ability to overdub and punch in parts. Also included are some features found otherwise only in high-end programs: SMPTE synchronization, programmable software faders, track harmonization, and a multiple-take loop style that assigns each recorded take to its own track and then mutes it. The latter is particularly useful if you want to record different solos over the same basic track and then cut and paste bits of each solo to create the perfect track while maintaining a live feel.

Beyond's approach to sequencing is largely architectural. Each sequence contains 32 sections that can be broken into 99 tracks per section. Each section can then, in turn, become one of 16 subsections. Subsections are represented as graphic blocks in the Note Editor window. To assemble a song, you simply string different subsections together.

The Music Writer notation program is the younger sibling of Great Wave's ConcertWare+MIDI. The program supplies eight staves, chords and guitar tablature, lyrics and text capabilities, part transposition, dynamic markings, Adobe's Sonata font (printer font not included), compatibility with Apple's MIDI Manager, and support for standard MIDI files. You can place notes on-screen by using a mouse, Mac keyboard, or MIDI.

Music Writer is well suited to the notational needs of novices. The program's highlights include the relative ease with which it lets you enter lyrics and text and its ability to copy single musical lines to HyperCard without requiring HyperTalk's arcane music-scripting protocol.

As far as hardware is concerned, the Intro+ package includes two MIDI cables that are black, five feet long, and functional. Although the Altech interface looks a bit squidlike, it too is functional.

Is Intro+ for you? Check the price. The entire Intro+ bundle comes to $439, including the $40 upgrade to Beyond 2.0. Considering that Beyond 2.0 alone retails for $319, add an extra $120 and you get a MIDI interface, two MIDI cables, and a notation program. For beginning MIDI musicians on a budget, Intro+ may be just what the doctor ordered.

Dr. T's Music Software, 100 Crescent Road, Needham, MA 02194; (617) 455-1454. $399. Upgrade to Beyond 2.0, $40.

— Christopher Breen

Earthquest
♣♣♣½

Earthquest is a HyperCard stack designed to instruct young users in the ways of Planet Earth through a series of games, puzzles, and quizzes. The software has a decidedly environmentalist edge to it, providing lots of useful, practical information on ways to save the planet. The package also includes a Workshop stack, where users can doodle with HyperCard's painting tools, and a Mystery Tour stack, a marginally magical test of the knowledge gained in Earthquest.

You begin your quest with the Explore card, a table of contents that serves as a springboard to the four major sections of the stack: Earth (earth sciences, including astronomy, geology, and meteorology), Journey (history), World Tour (geography), and Environment (environmental advocacy). Additionally, the Explore card contains a Map button that provides an overview of each card in the stack; a Help button; and a button linked to the Control Center, where different games are launched.

Part of the fun of opening any new HyperCard stack is pushing buttons to see where they lead. Because the Earthquest manual takes a free-and-easy approach to exploring the stack, a frenzy of button pushing may be the best way to start. Most of the cards are informational, containing

illustrations accompanied by interactive lists of facts, short histories, charts, and maps. Animation buttons are featured on some cards. Push one of these buttons, and you may well trigger an earthquake.

Glowing-light-bulb buttons indicate that a short quiz, based on the material on the card, is just a click away. If you answer a question correctly, you're rewarded with the sound of an orchestra and an animated picture of a grinning lizard. Incorrect answers cause a dweebie-looking kid to roll his eyes and cough rhythmically.

But don't let the game-playing aspect of Earthquest fool you. The stack bears a closer resemblance to a school textbook than to educational games such as the Carmen Sandiego series. Information is presented in a comprehensive and straightforward manner in Earthquest, but the disadvantage is that some sections of the stack tend to be a bit dry.

In addition, Earthquest's approach often fails to identify its users. Much of the information and the language used to convey it is suitable for teenagers, but the games and rewards (a certificate and pieces of a HyperCard puzzle) will probably be more enticing to nine-year-olds. Consequently, to gain the most from Earthquest, adult supervision (preferably in a classroom setting) is highly appropriate and even to be recommended.

Where Earthquest breaks from the educational pack is in the area of environmental advocacy. A large section of the stack is devoted to ecological disasters of the past and grim portents for the future. The Saving the Environment card contains useful information for people who would like to think globally and act locally on environmental issues. Earthquest, Inc., welcomes additional tips, and we recommend discontinuing the wasteful practice of packaging Earthquest floppy disks in nonresealable plastic bags.

Earthquest also has a few programming flaws, but nothing that a good debugging couldn't fix — for example, the Find command on the pop-up menus doesn't work.

Overall, Earthquest provides more breadth than depth. Its main role will be to spark students' interest in exploring a variety of topics in detail, albeit elsewhere. Placed in the right pair of guiding hands, Earthquest offers a useful introduction to life on our planet.

Earthquest, Inc., 125 University Avenue, Palo Alto, CA 94301; (415) 321-5838. Version 2.01. $79.95.

— Christopher Breen

Sonar Bookends

Sonar Bookends is designed to ease the tedious task of creating indexes for long documents. The package provides some unique and powerful tools, but interface flaws and a lack of editing tools detract from the program's overall usefulness.

Bookends automatically creates an index based on every word in a document. You can eliminate common words such as *a* or *the* by setting the program to ignore words appearing a certain number of times.

Unlike the indexing methods used by some word processors such as Microsoft Word or WordPerfect, Bookends' method requires no special characters or marking procedures to tag words for indexing. The drawback, however, is that Bookends' indexes are likely to include multiple unwanted entries.

Bookends also lets you create a separate phrase list for indexing. Although creating a phrase list may initially seem as time-consuming as using a word processor's indexing method, Bookends balances the inconvenience with some superior phrase-list features.

Using special characters, Bookends provides an impressive variety of Boolean selection options for creating phrase lists. For example, you can specify any variation of the word *Apple*, such as *Apples* and *Apple's*, to be included as part of the same index entry. Or you can specify words such as *John Sculley* and *Sculley, John* to be indexed together regardless of order of appearance. You can even specify the indexing of the words *John Sculley* in any order and appearing within ten words of the entry *Apple* or *Macintosh*. Although this requires some effort to set up, it really saves time in the long run. But despite these strengths, Bookends does a poor job of following Apple's interface guidelines. Equally disappointing is the lack of editing tools. To clean up indexes, you must use a word processor.

The result is that most users of word processors with built-in indexing will probably prefer to stick with them. However, Bookends is a good choice if you don't have a word processor with built-in indexing or if you require the package's unique abilities.

Virginia Systems, Inc., 5509 W. Bay Court, Midlothian, VA 23112; (804) 739-3200. Version 2.2. $129.95.

— Ted Landau

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Bobker's Dozen Best
MacUser, December 1990

"Good software can make using a hard disk a joy. Cirrus drives include an outstanding set of utilities."
Macworld, May 1989

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MacUser, April 1991

"The better looking zero-footprint drives come from La Cie... La Cie also makes the sporty Cirrus and Tsunami compact drives. If you are value conscious, you'll be hard pressed to beat La Cie."
Macworld, November 1990

"The La Cie Tsunami 50 uses a distinctive love-it-or-leave-it case designed for vertical placement by itself or for horizontal stacking of multiple drives. La Cie sells larger-capacity drives with zero-footprint cases."
MacUser, April 1991

"The [La Cie Tsunami 50's] case is durable, power-on as well as drive-activity indicator lights are provided, and bundled software is excellent."
MacUser, April 1991

"The La Cie ZFP 400 is an affordable hard disk drive with an actual capacity of 423 MB. Good support."
MacUser, December 1990

"Now here's an interface to get excited about (Silverscanner). La Cie's Photoshop plug-in offers more options than almost any other software, and it's all clearly labeled and easy to understand."
Publish, August 1991

Ask them.

"La Cie products were my favorites."
Macworld, September 1989

"The Silverscanner 300dpi scanner comes complete with its own image-capture software."
Macworld, August 1990

"The well-designed La Cie Tsunami 50 is an external, 50MB SCSI hard disk drive based on the new, fast Quantum LP52S mechanism. This was the second-fastest drive overall in our April '91 lab report."
MacUser, April 1991

"La Cie offers the leading combination of software and performance."
Macworld, March 1990

"[The La Cie 1000 MB ZFP Plus] provides good performance with the Silverlining 5.27 SCSI driver. Software provides password-protection and data-encryption functions."
MacUser, July 1991

"The La Cie 600R Magneto-Optical erasable optical drive is fast. Silverlining formatting software provides good SCSI performance."
MacUser, November 1990

"...the choice is clear: if you don't need a large scanning bed or a transparency option, buy the La Cie Silverscanner. It is one of the least expensive models under review, and its scans are among the best."
Macworld, June 1991

"If you are looking for a comprehensive hard disk utility that might boost your disk's performance, you should take a look at Silverlining. This handy utility is a hard disk formatter, driver installer, partitioner, and optimizer."
MacUser, December 1989

"The Silverscanner is also fast, and it comes with a one-year warranty and a good selection of software, including one of the more flexible Photoshop drivers around."
Macworld, June 1991

"Only one company, La Cie, has a hard partitioning utility that lets you resize partitions without losing data."
Macworld, November 1989

"Sure winners, the lightweight, silent and inexpensive Cirrus drives from La Cie come with first-rate utility software...the cream of the crop."
Macworld, May 1989

"The best termination solutions, however, come with drives from La Cie..."
Macworld, March 1991

World Class Awards (7): (1) Hard Drive — Under 80MB, (2) Hard Drive — 80MB to 160MB (1st place), (3) Hard Drive — Over 160MB (1st place), (4) Optical Drive (1st place), (5) Best Customer Support — Hardware, (6) Removable Media — Drive, (7) Scanner — Color
Macworld, September 1991

Now that you've seen what they've said, see what they mean.

When the subject is scanners, seeing is believing.

So, to see what the critics are raving about, we thought it wise to show you just how good La Cie looks compared to the competition — in this case, the Microtek 600ZS.

The result? When you compare the two images side by side just like the experts did, La Cie's Silverscanner™ beats Microtek.

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When Macworld recommended buying the La Cie scanner, they must have had some very good reasons in mind.

Maybe it's because we offer the finest, most reliable hardware in the industry.

Or that the Silverscanner delivers the kind of superior performance usually found in machines costing thousands more.

Or the fact that you get high-quality, true-to-life color. Sharp, accurate scans. Production-quality halftones with excellent detail in those troublesome shadow areas. Plus easy-to-use image controls, with full functions such as user-selectable halftoning, color dropout, gamma correction, brightness and color correction. All right at your fingertips.

Faster previews, faster scans.

If you've ever used a scanner, you know what it means to wait for the entire preview to finish before you can make any adjustments to your scan settings. It's a process that can burn up a lot of your time.

But thanks to our single dynamic preview window, you can modify your scanner functions *during* the preview. That means no more waiting around for the preview to finish before making your scan settings and starting your final scan. Suddenly, your previews take seconds instead of minutes.

In fact, the Silverscanner is so fast — and will save so much time — you can often finish your scans *before* other scanners are even finished previewing.

Microtek Scan

Silverscanner

Microtek Scan

Silverscanner

Microtek Scan

Silverscanner

For this comparison, we used a Microtek 600ZS and a La Cie Silverscanner. All scans were done at default settings with no corrections. The color images were separated using Adobe Photoshop. The top of the letter "C" in the La Cie logo was scanned at the maximum dpi setting (600 dpi on the Microtek 600ZS and 1200 dpi on the Silverscanner) and was enlarged so you can more easily see the difference. See the La Cie logo below scanned at 1200 dpi at actual size. You compare, you see the difference, the La Cie Silverscanner — better color, more shadow detail and smoother line art.

The hardware is great. The software is priceless.

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Because until now, no one's ever loaded as much capacity into such a compact, portable and easy-to-use drive as La Cie.

Portability with a purpose.

So maybe you're a skeptic. And you're thinking that PocketDrive, being as small as a billfold, must somehow skimp on performance.

Wrong.

For starters, with 80MB of storage* it's plenty powerful, letting you store and transport more files and applications than you can shake a stick at.

And when you consider its all-new 2½ inch drive technology, fast 19ms seek time, plus the quietest operation this side of a mime troupe, it's clear that PocketDrive really gives you maximum performance in a minimum of space.

*Also available with 40MB.

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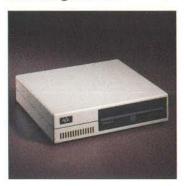
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	Internal*	External
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100MB ZFP Drive	$ 449	$ 499
120MB ZFP Drive	$ 699	$ 799
170MB ZFP Drive	$ 749	$ 849
200MB ZFP Drive	$ 799	$ 899
400MB ZFP Plus Drive	$1599	$1699
600MB ZFP Plus Drive	$2049	$2199
650MB ZFP Plus Drive	$2249	$2399
1.2GB ZFP Plus Drive	$2749	$2899
1.6GB ZFP Plus Drive	$4049	$4199

*Not available for all Macintosh computers

Cirrus Drives

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Introducing: The PowerBooks
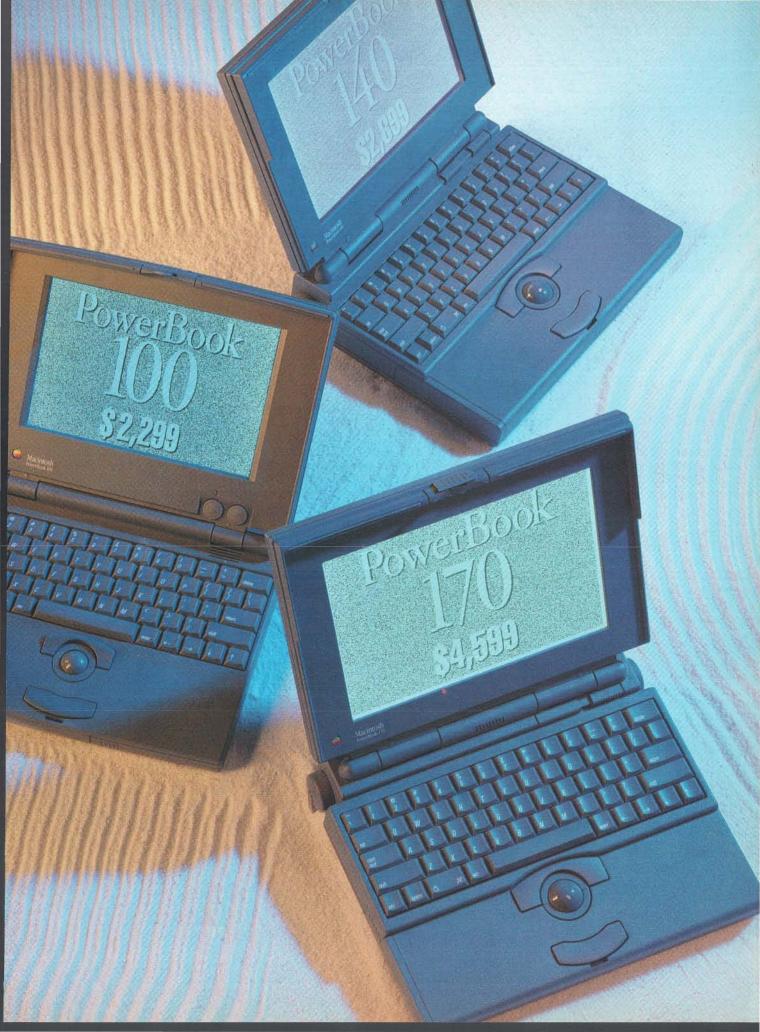
Light, fast, and powerful, Apple's dazzling notebook computers are more than a match for your desktop machine.

BY RUSSELL ITO

Macintosh Portable is an oxymoron — just ask anyone who's ever sprinted through an airport terminal lugging one. Apple may have been caught napping when it designed that product, but it's wide awake now and aware that Mac users are only a small part of the bigger world of *computer* users. Apple's impressive family of notebook computers, the PowerBooks, is the most important new direction for Apple since the introduction of the Mac II. Computer users who simply want the best tool for the job will be thrilled with these notebooks, whether there's a Mac on their desk or not.

Although the Mac Portable was (just barely) transportable, it wasn't a computer for anyone other than Mac users who insisted on a Mac and nothing less. The PowerBooks should appeal to anyone who needs to work with a computer — anyone, anywhere.

PHOTOGRAPHY: WALT DENSON

PowerBook
140
$2,899

PowerBook
100
$2,299

PowerBook
170
$4,599

Figure 1: PowerBook 100 Back Panel

Backup-battery holder
(for PSRAM)
Audio-out port
HDI-30 SCSI port
HDI-20 floppy-drive port
Printer/LocalTalk port
ADB port

Storage*
AC-adapter port

*The Storage switch completely disconnects the battery so no battery power is lost during long periods of storage.

Figure 1: Because of the PowerBooks' small size, Apple had to develop some new port designs, including a new 30-pin SCSI port. The PowerBook 100 also has a special port for an external floppy drive.

Many Hits

In designing the PowerBooks, from the base-model PowerBook 100 to the midpower PowerBook 140 to the fully loaded PowerBook 170, Apple successfully conquered several fundamental issues in portable computing.

First, weight. All the PowerBooks weigh less than 7 pounds — even with hard drives. For example, the model 170 — which includes a hard drive, a floppy drive, a modem, and an active-matrix display — still weighs only 6.8 pounds. Second, size. All three models have footprints roughly the size of an 8.5-x-11-inch sheet of paper, so they easily fit on an airplane tray and you can even use one on your lap without cutting off the blood flow to your feet. Third, usability. All three PowerBook models feature a unique layout, with the keyboard placed toward the rear of the base. This provides you with a convenient wrist rest and a place for the integrated trackball, which you can easily control with your thumbs (one on the button, the other on the ball) without taking your fingers off the keyboard. The keyboard is extremely quiet, with a slightly springier touch than that of an Apple Extended Keyboard. The keys are marginally smaller and more tightly spaced than those on a desktop keyboard, but your fingers adjust quickly. Fourth, screen visibility. All three PowerBooks use backlit screens: The 100 and 140 have Supertwist LCD displays, and the 170 boasts an active-matrix panel. Regardless of the difference, all three are clearly visible across an exceptionally wide viewing angle—even from as much as 60 degrees off-axis. Plus, the contrast and brightness controls are conveniently placed just below the display panel, so making adjustments is easy. Fifth, completeness. All the Power-Books include one ADB port, a new 30-pin SCSI port, and a LocalTalk port for networking. In addition, all the PowerBooks are bundled with AppleTalk Remote Access software, so you can dial in to your desktop machine or network as if you were actually there. Apple also offers an optional 2,400-bps data/9,600-bps fax-send internal modem. Sixth, memory. Instead of the expensive static RAM that Apple used on the original Macintosh Portable, the

Table 1: Picking a PowerBook

	Pros
PowerBook 100	•Lightest PowerBook. •Twice as fast as a Classic.
PowerBook 140	•Internal floppy drive. •32-bit QuickDraw in ROM. •Three times as fast as a Classic. •Choice of hard drives.
PowerBook 170	•Most powerful model. •Math coprocessor. •32-bit QuickDraw in ROM. •Internal modem standard. •Up to five times as fast as a Classic. •Best screen display.

Figure 2: PowerBook 170 Back Panel

- AC-adapter port
- Internal-modem port
- HDI-30 SCSI port
- ADB port
- Audio-in/out port
- Printer/LocalTalk port

- Reset/Interrupt
- On/Off

Figure 2: The PowerBook 140 and 170 have identical back panels; the 170 is shown here. The backup battery is on the motherboard, so there is no backup-battery holder. Features not found on the PowerBook 100 are an audio-in port and a reset switch.

PowerBooks use pseudostatic RAM, which should be significantly cheaper. Seventh, price. Unlike with past Macintosh computers, Apple has priced its PowerBooks very much in line with their DOS/Windows competitors.

Cons	Ideal Uses
•No internal floppy drive. •1-bit video only. •No video-out port. •No Ethernet support. •20-megabyte hard drive only.	•Excellent for text-based tasks. •Excellent second computer.
•No video-out port. •No Ethernet support.	•Excellent for text work or number crunching. •Viable primary computer. •Ideal second computer.
•No video-out port. •No Ethernet support.	•Excellent for presentations. •Powerful enough to be a primary computer.

The base-model PowerBook, the 100, lists for $2,299 ($2,499 with an external floppy drive); the 140, $2,899; and the 170, $4,599.
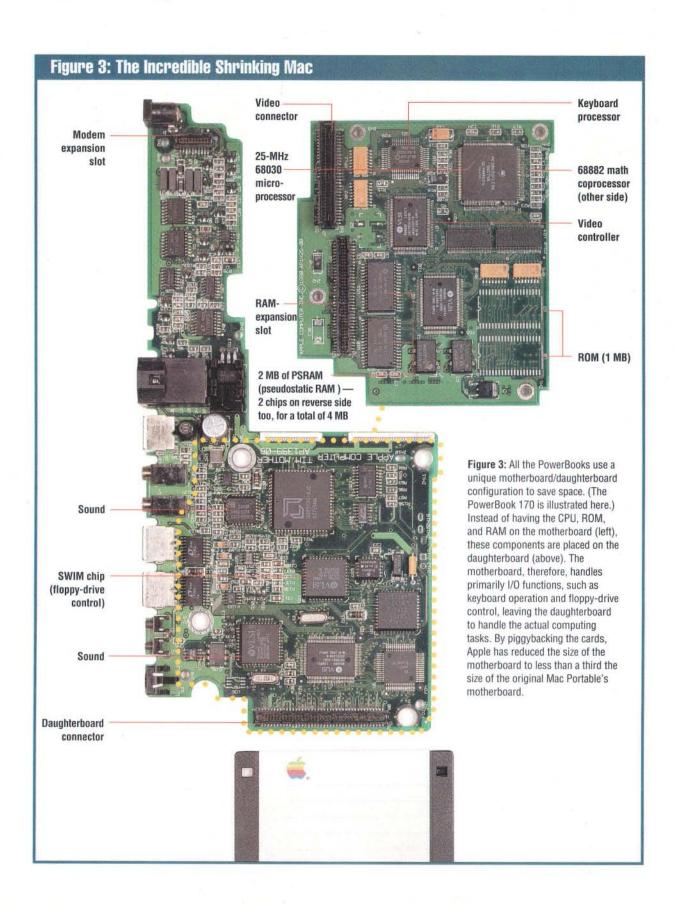
Still a Few Misses

But before you start thinking that Apple has captured nirvana in gray — make that "granite" — plastic, be advised that the PowerBooks do have a few limitations. For instance, there is no built-in support for Ethernet — nor is it available as an option. This could make connecting to Ethernet networks a problem or be, in Apple-ese, a "third-party opportunity." We expect that some vendors will offer SCSI-based Ethernet solutions, and in fact, Dayna Communications has already announced such a product (see the "Power Peripherals" sidebar). But disrupting a SCSI chain to connect to a network — especially if the connection is only temporary — is inconvenient at best. In addition, there is no video-out port, so none of the PowerBooks can be connected directly to an external monitor — this even though the 140 and 170 models have 32-bit Color Quick-Draw in ROM. RasterOps and Radius have announced SCSI-based solutions, and Envisio has yet another option (see "Power Peripherals"). Having wrestled with the black art of SCSI termination, however, the prospect of adding Ethernet and video to the chain doesn't exactly fill us with confidence.

Then there's the issue of System 7 and memory. We originally planned to test all the units in their base configurations, which, in the case of the 100 and 140 models, meant 2 megabytes of RAM. However, at Apple's suggestion, we changed our plans and tested all three models with 4 megabytes. Because the PowerBooks all ship with System 7.0.1 — in fact, they require it — and Apple has always said that 2-megabyte Macs are ready for System 7, we asked why the company preferred that we test the units in

Notebook Computers

Figure 3: The Incredible Shrinking Mac

Modem expansion slot

Video connector

25-MHz 68030 microprocessor

RAM-expansion slot

2 MB of PSRAM (pseudostatic RAM) — 2 chips on reverse side too, for a total of 4 MB

Keyboard processor

68882 math coprocessor (other side)

Video controller

ROM (1 MB)

Sound

SWIM chip (floppy-drive control)

Sound

Daughterboard connector

Figure 3: All the PowerBooks use a unique motherboard/daughterboard configuration to save space. (The PowerBook 170 is illustrated here.) Instead of having the CPU, ROM, and RAM on the motherboard (left), these components are placed on the daughterboard (above). The motherboard, therefore, handles primarily I/O functions, such as keyboard operation and floppy-drive control, leaving the daughterboard to handle the actual computing tasks. By piggybacking the cards, Apple has reduced the size of the motherboard to less than a third the size of the original Mac Portable's motherboard.

4-megabyte configurations. Apple's explanation was that most PowerBook buyers will also buy a 2-megabyte memory upgrade. This may be as close as Apple will ever come to admitting that System 7 is a 4-megabyte operating system.

The PowerBook 100: LC Power

The PowerBook 100, which Sony manufactures for Apple, is the base model in the PowerBook line. As in the Mac Classic, the heart of the model 100 is a Motorola 68000, but it runs at 16 megahertz — double the Classic's clock speed. The backlit Supertwist LCD screen measures 640 x 400 pixels, or just slightly larger than the Classic's, and its off-axis visibility is excellent. The 100's battery is a sealed lead-acid model, with a reported life of two to four hours and a three-hour recharge time. The model 100 comes standard with 2 megabytes of RAM and a 20-megabyte hard-disk drive. Unlike its two bigger siblings, the model 100 has no internal floppy drive, although a small external unit is available either as an option or in a bundle.

For most of *MacUser*'s editors, the lack of a floppy drive didn't present a problem. They felt that an external floppy drive would remain back at the office on the user's desk and be used only for loading and copying files. And because Apple's new SCSI cables let you connect a PowerBook to a SCSI chain — the 100 can even be docked as a hard drive instead of as a CPU — the lack of a floppy drive wasn't considered important. However, a vocal minority complained that not having the floppy drive made receiving files on the road a tougher proposition and that it eliminated the possibility of restarting from a floppy in the event of a corrupted System file. Both sides conceded the validity of the other's arguments, but neither faction was convinced.

Our tests of a preproduction model, however, were convincing (see Figure 4). The 4-megabyte PowerBook 100 consistently outperformed a similarly equipped Mac Classic. In fact, in all but one test (the Microsoft Word scroll), the PowerBook 100 was at least twice as fast as a Classic. In our Excel 3.0 recalculation test, for example, the PowerBook 100 was nearly two and a half times as fast as a Classic. Although the 100 performed nearly as well in our Word find-and-change test, it was only about 10 percent faster than a Classic in a test of scrolling speed. In fact, the PowerBook 100 bettered the performance of a 4-megabyte Mac LC running in 1-bit mode in all but one test.

With a footprint of 11 x 8.6 inches, a height of less than 2 inches, and a weight of slightly more than 5 pounds, we think the PowerBook 100 is destined to be a new Classic.

The PowerBook 140: Beating the LC

The PowerBook 140 fills the middle slot in the PowerBook line. With a 16-megahertz 68030 as its CPU, the PowerBook 140 offers performance that generally tops a similarly

Figure 4: Performance of the PowerBooks

PowerBook performance compared with that of other Macs

*Averaged performance
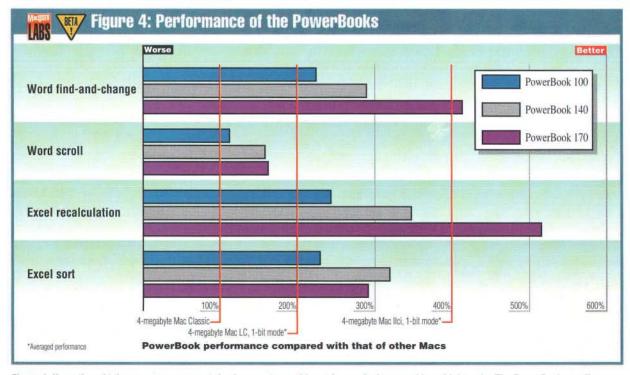
Figure 4: If you thought there was no way a notebook computer could match your desktop machine, think again. The PowerBooks easily outperform a Mac Classic — by as much as two to five times (depending on the model and the test). The PowerBook 170's math coprocessor gave it a big boost in the Excel recalculation test. Apple attributed the 140's advantage over the 170 in the Excel sort test to Microsoft's software. (All tests were performed on 4-megabyte preproduction PowerBooks with early system software.)

equipped Mac LC running in 1-bit mode, by 35 to 50 percent. The model 140 uses the same display as the model 100, but an internal floppy drive is included, as is your choice of either a 20- or a 40-megabyte hard drive. The model 140 uses the same type of NiCad battery as does the

top-of-the-line model 170, with an expected life of two to three hours and a recharge time of three hours.

In our tests, the PowerBook 140 was consistently 20 to 30 percent faster than the PowerBook 100 and it was also ahead of a similarly equipped Mac LC. Compared with a

Power Peripherals

How can you make a PowerBook into a More-PowerfulBook? A wide range of up-grades, accessories, and peripherals are available from Apple and from third-party vendors.

Apple Products
Apple's offerings enable you to improve the PowerBooks' memory, battery life, and connectability.

2-Megabyte and 4-Megabyte Memory Expansion Kits
PSRAM (pseudostatic RAM) cards to bring your PowerBook up to 4 or 6 mega-bytes. 2 megabytes, $399; 4 megabytes, $899.

Macintosh HDI-20 External 1.4-Megabyte Floppy-Disk Drive
The external floppy-disk drive for use with the PowerBook 100. It can read and write Mac, DOS, OS/2, and ProDOS for-mats. $279.

Macintosh PowerBook 100 Battery Recharger
This is a recharger for extra lead-acid batteries used in the PowerBook 100. One or two batteries can be recharged at the same time. $159.

Macintosh PowerBook 140/170 Battery Recharger
This is a recharger for extra NiCad batter-ies used in the PowerBook 140 and 170 (you can recharge the battery in a PowerBook simply by plugging in the AC adapter that comes with it). One or two batteries can be recharged at the same time. $159.

Macintosh PowerBook 100 Rechargeable Battery
Extra lead-acid battery. $99.

Macintosh PowerBook 140/170 Rechargeable Battery
Extra NiCad battery. $99.

Macintosh PowerBook Fax/Data Modem
A small internal modem, Apple's Fax/ Data Modem is a 2,400-bps data/9,600-bps fax-send unit. It comes with Apple's Chooser-level fax software, which lets you send a file as a fax from any application. $349.

Apple HDI-30 SCSI Disk Adapter
The PowerBook 100 can be connected to a SCSI chain as a hard drive instead of as a CPU. This cable lets you "dock" your PowerBook 100 so it appears on the desk-top as just another volume. $49.

Apple HDI-30 SCSI System Cable
To keep the size of the PowerBooks down, Apple has introduced a different SCSI cable. Instead of a 50-pin trapezoidal con-nector, Apple has produced a 30-pin square model. $49.

Video Products
The PowerBooks and the Classic II share two big omissions: no video-out port and no Ethernet support. The video problem is especially notable, because the PowerBook 140 and 170 and the Classic II have 32-bit QuickDraw in their ROMs. So although they can drive color or gray-scale monitors, no direct connection is possible.

Radius PowerView
Radius' solution is the PowerView, a four-pound SCSI box. The PowerView can drive a 640-x-480-pixel display, including almost any projection panel; the Apple 13-inch RGB; and VGA displays at 8 bits (256 colors). It connects via a standard SCSI cable and works with any 68020- or 68030-based Mac (currently, it doesn't work with the PowerBook 100). Radius' future Power-View plans include software-upgrade sup-port for the Radius Pivot, Color Pivot, and FPD.

2-Megabyte and 4-Megabyte Memory Expansion Kits

Macintosh HDI-20 External 1.4-Megabyte Floppy-Disk Drive

Macintosh PowerBook 100 Battery Recharger

Macintosh PowerBook 140/170 Battery Recharger

Macintosh PowerBook 100 Rechargeable Battery

Macintosh PowerBook 140/170 Rechargeable Battery

Apple HDI-30 SCSI Disk Adapter

Apple HDI-30 SCSI System Cable

Classic, the PowerBook 140 was three to three-and-a-half times as fast. The PowerBook 140 was at least 20 percent faster than the model 100 in both Excel benchmark tests, meaning that it was as much as 50 percent faster than an LC in those operations. In our Word tests, the model 140 was at least 20 percent faster than the model 100, and although its scrolling speed was 10 percent slower than that of an LC, it beat the LC by nearly 40 percent in the Word find-and-change test.

Although it is slightly larger and about two pounds

Radius PowerView   Envisio VideoSimms

Envisio Notebook
Display Adaptors

Dayna DaynaPORT
SCSI-Link

Kensington Carrying Cases

Radius, 1710 Fortune Drive, San Jose, CA 95131; (408) 434-1010. $599.

RasterOps ClearVue/PD21

RasterOps' ClearVue/PD21 is also a SCSI-based product, but the video circuitry is built in to the same box as the monitor itself. The ClearVue is a 1-bit monochrome two-page display that connects via a standard SCSI cable to any Mac with a SCSI port. It should be available around the end of the year.

RasterOps, 2500 Walsh Avenue, Santa Clara, CA 95051; (408) 562-4200. Less than $2,000.

Envisio Notebook Display Adaptors and VideoSimms

Unlike Radius' and RasterOps', Envisio's products for the PowerBooks and the Classic II are entirely internal. The Notebook Display Adaptors are cards that plug in to the PowerBooks' memory-expansion slot, providing video circuitry, additional memory, and a video port. Installed in a PowerBook 100, the cards can drive VGA monitors at 1 bit as well as Mac monitors ranging in size from 13 to 21 inches. The Notebook Display Adaptor 030 is designed for the PowerBook 140 and 170 and includes video circuitry, a

pass-through memory-expansion slot, and a video port. It can drive monochrome monitors as large as 21 inches and 8-bit color displays as large as 14 inches.

Envisio's VideoSimms are a pair of circuit boards, about the size of regular SIMMs, that install in the Classic II's SIMM sockets, providing 2 megabytes of additional RAM and the ability to drive monochrome displays as large as 21 inches — including full-page displays. An Envisio custom-tooled connector adds a DB-9 video-out port to the back of the Classic II.

Envisio, 5365 W. Bald Eagle Blvd., White Bear Lake, MN 55110; (612) 653-7694. Notebook Display Adaptors, $695 (1-megabyte and 030); $795 (2-megabyte); $995 (2-megabyte and 030); VideoSimms, $595 per pair.

Ethernet

Now that Apple has officially blessed Ethernet, high-speed Mac networks will become increasingly widespread, so Ethernet connectivity will be increasingly important.

Dayna DaynaPORT SCSI-Link

The DaynaPORT SCSI-Link is a SCSI box that provides Ethernet connectivity to any

Mac without a slot. It connects via a standard SCSI cable and provides support for all Ethernet cabling schemes: 10BASE-T, thicknet, thinnet, and fiber optic. It should be available this month.

Dayna Communications, 50 S. Main, Fifth Floor, Salt Lake City, UT 84144; (801) 531-0203. $399.

Accessories

At press time, PowerBook accessories were still scarce, but you can expect that to change in a hurry.

Kensington Carrying Cases and Numeric Keypad

The PowerBooks don't come with a carrying case of any kind, so Kensington has produced two types: a simple slipcase that fits snugly around the notebook and a true carrying case that's big enough to hold the computer plus accessories. The Numeric Keypad is an ADB device that matches the PowerBooks' unique design and includes a keypad and cursor keys.

Kensington Microware, 2855 Campus Drive, San Mateo, CA 94403; (800) 535-4242 or (415) 572-2700. Cases, $59.95 and $99.95; Numeric Keypad, $129.95.

Notebook Computers

Meeting the Competition

The PowerBooks are the latest entrants in an already crowded laptop scene. DOS and Windows laptops come in dozens of configurations, with every conceivable variation in weight, size, and features. We looked at six DOS machines running Microsoft Windows and found that our preproduction PowerBooks stacked up pretty well against their competition.

The PowerBook 100 competes with Texas Instruments' TravelMate 2000 ($1,199) and the Compaq LTE/286 ($1,949), both Intel 80286-based machines. The 140 is comparable with the Everex Tempo LX ($3,199) and the Toshiba T2000SX ($3,399), each with a 16-megahertz 386SX CPU. The top-of-the-line 170 is roughly equivalent to the Compaq LTE 386SX/20 ($4,399) and the AT&T Safari NSX/20 ($4,749), which are 20-megahertz 386SX machines.

When you're on the road, the less you have to carry, the better, and the PowerBooks win hands down. The PowerBooks' external power supplies are smaller and lighter than those of our DOS models; plus, the DOS machines don't have a built-in trackball, so we needed a mouse to run Windows (using Windows without a mouse is a bit like riding a horse without reins — it can be done, but

it's clumsy). Most of our DOS laptops didn't fit in their cases with the mouse attached, and *no* DOS laptop lets you close the screen when a trackball is attached.

Our DOS laptops all had flat keyboards — only the Apple PowerBooks had rear feet for tilting the unit to a comfortable angle. The DOS laptops' screens were so much slower than the PowerBooks' that the cursor disappeared when we moved the mouse. The PowerBook 100's screen was about equal in quality to the TravelMate 2000's, which had the best of the DOS screens, with a wide viewing angle and good-quality graphics. The PowerBook 140's screen is superior to the Toshiba and Everex screens, and the 170's active-matrix screen is quite possibly the best of any laptop's, in terms of speed, viewing angle, and quality. Unlike most DOS laptops, the PowerBooks don't warn you with a beep if you close the screen with the power on, but the PowerBooks' automatic sleep feature prevents you from inadvertently draining your battery.

The PowerBooks also surpass their DOS counterparts in built-in networking. In addition to the standard LocalTalk connection, the PowerBooks come with AppleTalk Remote Access, which gives you wide-area

networking capabilities that no other laptop offers.

Finally, don't let anyone tell you that Microsoft Windows is just like the Finder. Windows lacks many of the System 6 and 7 features that Mac users take for granted, such as click-and-drag copying between disks. The PowerBooks come ready to use from the box, with System 7 and networking software already installed on the hard disks. With a DOS laptop, you'll probably have to install Windows, which can take several hours. Of the six DOS laptops we looked at, only the AT&T Safari came with Windows installed.

Our spreadsheet tests showed that one area in which 80386SX-based laptops can claim superiority is in number crunching. But a 386 won't buy you much in the way of extra performance if your main tasks are word processing and telecommunications.

Although the PowerBooks trailed their DOS counterparts in the Excel tests, they far outstrip their competition in usability and completeness. A laptop computer should help you get your work done fast with a minimum of frustration. On that score, the PowerBooks are clear winners.

— John Rizzo
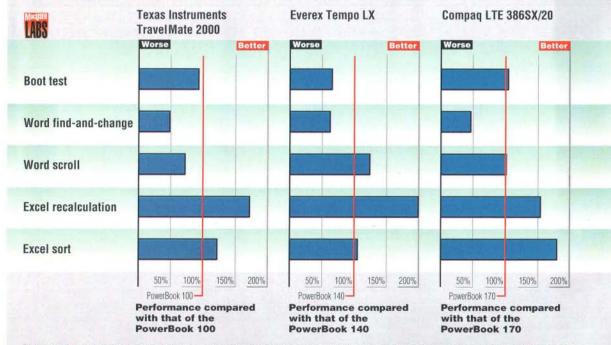
Figure A: Pairing comparable DOS laptops with the PowerBooks, we found that the DOS machines running Windows were faster overall. However, the DOS units were harder to set up and use.

heavier than a PowerBook 100, the PowerBook 140 may be the choice of users who don't want to carry an external floppy drive. Plus, it is several times faster than the Mac Classic and substantially faster than the LC.

The PowerBook 170: The Ultimate

The PowerBook 170, the top of the line, comes with every available option already installed. Built around a 25-megahertz 68030, with a 68882 math coprocessor, Apple's 2,400-bps data/9,600-bps fax-send internal modem, and 4 megabytes of RAM, it's the fastest and most powerful model in the PowerBook family. In fact, its performance nearly matches that of a Mac IIci. Like the model 140, it includes an internal floppy drive and a hard-disk drive (40 megabytes). Unlike the other two PowerBooks, however, the 170 boasts a sharp, fast, 640-x-400-pixel, backlit, active-matrix LCD screen. The battery is the same as that of the model 140.

Although Apple says the model 170's performance should be as much as 50 percent faster than the model 140's, our tests, based on a preproduction unit and early system software, didn't show such a dramatic difference. In general, our unit was faster than the model 140, but not by 50 percent. Instead, we saw performance improvements in the range of 20 to 30 percent. Overall, the model 170's performance was comparable with that of a Macintosh IIci and as much as five times as fast as a Macintosh Classic's. In the Excel recalculation tests, for example, the model 170

outperformed the model 140 by about 30 percent.

The PowerBook 170 offers a unique Power Saver mode that automatically slows down the CPU if the system doesn't detect any serial-port or ADB activity such as a floppy being inserted, a mouse movement, or keyboard action. If you're performing a long recalculation, for instance, the PowerBook 170 can switch into Power Saver mode, so instead of having a 25-megahertz CPU, you actually get a 16-megahertz chip. In our recalculation test, Power Saver mode added 40 percent to the benchmark time. Fortunately, Power Saver can be turned off.

The PowerBook 170 packs enough power to be the primary computer for most users — wherever they may be.

A Fine Family

The PowerBooks should appeal to more computer users than any model line Apple has yet introduced. Mac users will be jubilant at the prospect of finally getting a Mac in a small, light package. Notebook buyers, who, like compulsive dieters, are more interested in weight than anything else, will now have even more choices, and buyers in mixed environments, who have had little choice but to go with DOS- or Windows-based notebooks, can finally consider a Mac for the road without starting a weight-lifting program. With the introduction of the PowerBook line, Apple has entered its newest market with three winners.

Senior editor Russell Ito is currently trying to decide which PowerBook he'll buy.

Table 2: Apple's PowerBooks

	PowerBook 100	PowerBook 140	PowerBook 170
List price (MB RAM/drive)	$2,299 (2/20) $2,499 (2/20 plus floppy)	$2,899 (2/20) $3,199 (2/40)	$4,599 (4/40)
Dimensions (W x D x H, in.)	11 x 8.6 x 1.8	11.25 x 9.3 x 2.25	11.25 x 9.3 x 2.25
Weight	5.1 lb	6.8 lb	6.8 lb
CPU	16-MHz 68000	16-MHz 68030	25-MHz 68030
Coprocessor	NA	NA	68882
RAM (pseudostatic)	2 – 8 MB	2 – 8 MB	2 – 8 MB
Floppy drive	external SuperDrive (optional)	internal SuperDrive	internal SuperDrive
Hard drive	20 MB	20 or 40 MB	40 MB
Display type	backlit Supertwist LCD	backlit Supertwist LCD	backlit active matrix
Display dimensions	640 x 400 pixels	640 x 400 pixels	640 x 400 pixels
Battery type	lead acid	NiCad	NiCad
Battery life	2 – 4 hours	2 – 3 hours	2 – 3 hours
Ports	HDI-30 (SCSI), RS-422 (serial), ADB, HDI-20 (floppy), audio out	HDI-30 (SCSI), 2 RS-422 (serial), ADB, audio in, audio out	HDI-30 (SCSI), 2 RS-422 (serial), ADB, audio in, audio out
Modem	optional	optional	2,400-bps data/9,600-bps fax-send, internal
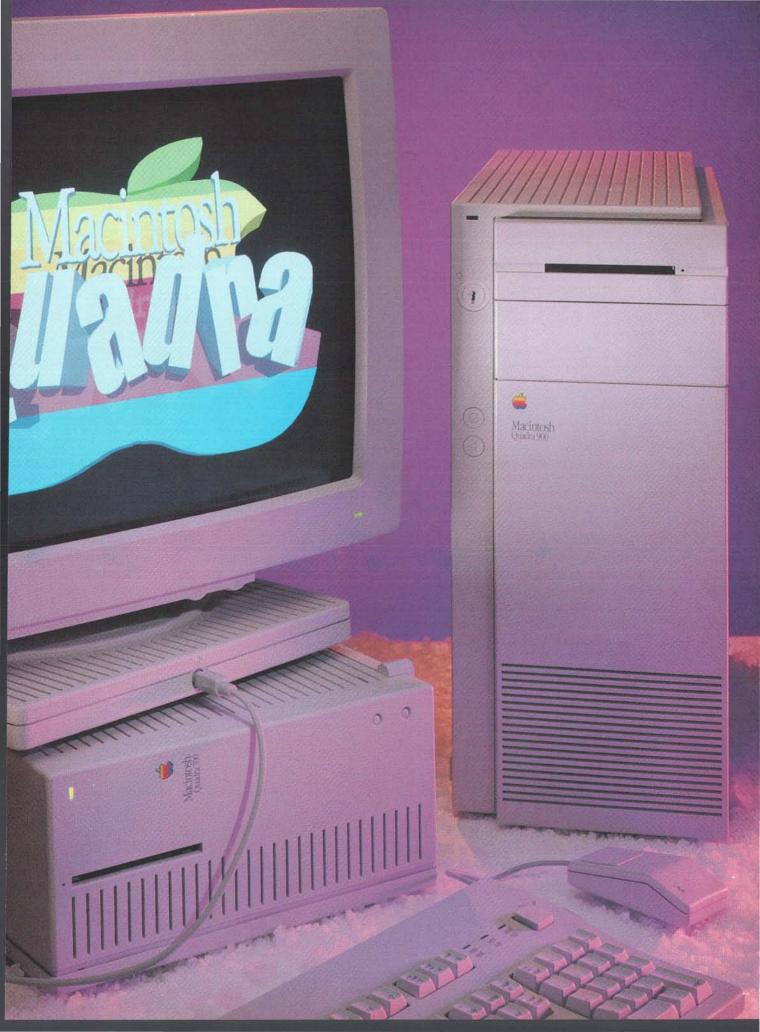
Dual Dynamos: The Macintosh Quadra 700 and 900

Integrated Ethernet, 24-bit video, and 68040 power. Here's our first look at the fastest, most powerful Macs yet.

BY RUSSELL ITO

Ceilings are paradoxical. In fact, you could say that they don't really exist. After all, a ceiling is just a floor viewed from a different vantage point. This paradox certainly holds true for the Mac. Each time Apple has introduced a more powerful Macintosh, it has raised the ceiling on computing as well as provided a new base from which the company could launch even-more-powerful Macs. Two years ago, that more powerful computer was the IIfx, and now we have the first family of 68040-powered Macs: the Quadra 900 and 700.

The Quadra 900 is Apple's much-rumored "tower" computer. It was not designed to function solely as a dedicated server, however. If it had been, as Apple points out, it wouldn't have been necessary to include 24-bit-color video on the motherboard or a large high-quality speaker (and a great beep sound). The Quadra 900 *is* more like a dedicated server than anything Apple has built so far, and it's easily the fastest and most powerful Mac ever. The Quadra 700, on the other hand, is a desktop machine (the 900 is really a "deskside" computer). It's the same size as a IIci and is the logical successor to the IIfx, which Apple expects to eventually phase out.

Middle-Aged Macs

The Motorola 68040, the heart of the Mac Quadras, is far more complex than any CPU Apple has used so far. It packs 1.2 million transistors, including large data and instruction caches and a subset of the 68882 math coprocessor that eliminates the need for a second chip, all on a single chip about half an inch square.

Unlike the 68030, the 68040 isn't entirely backward-compatible. Because of differences between the cache design of the 68030 and the 68040, many programs, in their current versions, simply don't work with the 68040. Developers are rushing to catch up, however, and some will have their 68040-compatible versions out by the time you read this. (Yes, we discovered that Microsoft's software was some of the least compatible, and yes, Microsoft assures us that it will be able to correct its problems quickly.)
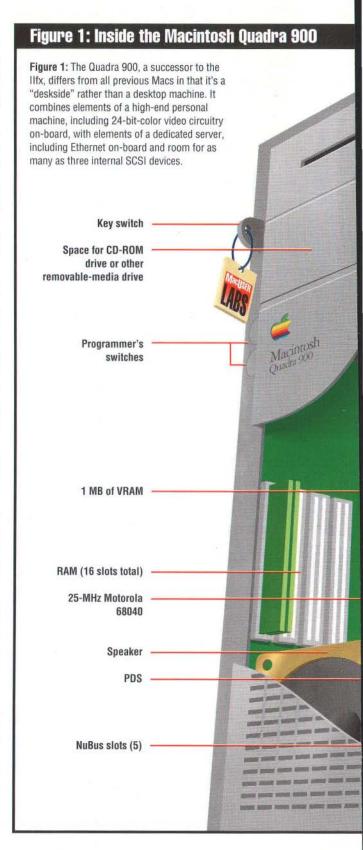
The Quadra 900 and 700 are functionally identical. They each use a 25-megahertz 68040 microprocessor, each comes standard with Ethernet and AppleTalk ports, and each has integrated video that Apple claims will deliver 80 to 85 percent of the 8•24 GC card's performance. (Unfortunately, we weren't able to verify this claim in time for this story.) If you add more VRAM SIMMs to increase the VRAM to 2 megabytes, the internal video can drive a 13- or 16-inch color monitor at 24 bits. If you want to drive a monitor larger than 16 inches at 24 bits, however, you'll have to invest in a third-party video card — not even Apple's own Macintosh Display Card 8•24 GC will work.
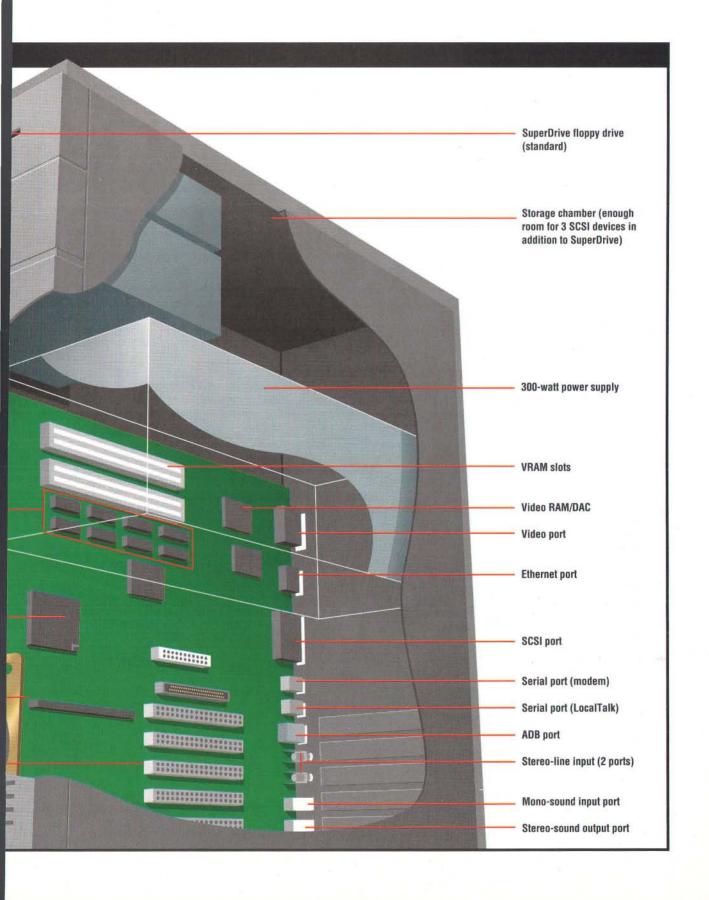
In addition to having a faster CPU than previous Macs, each machine boasts faster NuBus and SCSI ports. The Quadras have a new SCSI controller, which increases SCSI performance to as much as twice as fast as that of a IIfx. They also support block-mode transfers among cards on the NuBus, making card-to-card communications twice as fast as with previous Mac NuBus implementations. Similar transfers from the NuBus to main memory are also supported, but data transfers in the opposite direction (from main memory to the NuBus) are not.

Although there are differences between the two Quadras, most don't affect their internal performance. We decided to test the 900 as a server with a preliminary version of the new AppleShare — AppleShare 3.0. See "A New Way to Share," in this month's Bridges section, for the surprising results. We tested the 700 as a desktop machine.

The Quadra 900: Tower of Power

The Quadra 900 is Apple's new top-of-the-line Macintosh. Unlike any other Mac, the 900 is specifically intended to be a floor-standing unit — with the emphasis on *standing:* This is a vertically oriented machine. The 900 is roughly as tall as a Mac IIfx stood on end, but it's about six inches deeper and nearly twice as wide. The reasons for the expanded dimensions become apparent when you look inside the case (see Figure 1).

Figure 1: Inside the Macintosh Quadra 900

Figure 1: The Quadra 900, a successor to the IIfx, differs from all previous Macs in that it's a "deskside" rather than a desktop machine. It combines elements of a high-end personal machine, including 24-bit-color video circuitry on-board, with elements of a dedicated server, including Ethernet on-board and room for as many as three internal SCSI devices.

Key switch

Space for CD-ROM drive or other removable-media drive

Programmer's switches

1 MB of VRAM

RAM (16 slots total)

25-MHz Motorola 68040

Speaker

PDS

NuBus slots (5)

SuperDrive floppy drive
(standard)

Storage chamber (enough
room for 3 SCSI devices in
addition to SuperDrive)

300-watt power supply

VRAM slots

Video RAM/DAC

Video port

Ethernet port

SCSI port

Serial port (modem)

Serial port (LocalTalk)

ADB port

Stereo-line input (2 ports)

Mono-sound input port

Stereo-sound output port

68040 Alternatives

Although the Macintosh Quadras are Apple's first 68040 products, they aren't the first 68040 products for the Mac — Radius' Rocket and Fusion Data's TokaMac 68040 accelerators have been out for some months. The Quadras' release doesn't spell the end for these products.

The TokaMac will continue to provide a 68040 upgrade path for computers that otherwise wouldn't have one — specifically the LC and IIsi. Radius, however, has opted to take its Rocket technology into a whole different arena.

Rocket Science

The Rocket was designed in such a way that the processor on the Mac's motherboard remained partially active, handling basic I/O functions. Radius has now announced Saturn V, a System 7 software extension for the Quadras that lets the processor on the motherboard remain completely active when a Rocket is installed.

Once a Saturn V-equipped Quadra has been launched, a Saturn V icon appears on the desktop. Double-clicking on the icon opens a resizable window with a complete desktop, including a menu bar and Trash. The mounted volumes on the host Quadra appear as AppleShare volumes in the Saturn V window.

Because the two 68040 processors — the one on the Rocket and the one on the Quadra — are both available for use, you can work in a foreground/background mode. So, for example, you can launch a complex 3-D rendering in the background on the Rocket while you continue to work with a spreadsheet or word-processing program on the Quadra. And because System 7's IAC capabilities permit applications to support distributed processing, a Saturn V-equipped Quadra will be able to take advantage of applications that support distributed processing. It will be able to share a single task between the two processors, in effect cutting the processing time in half by applying twice the computing power to the job.

Radius expects to ship the Saturn V software in the first quarter of 1992.

Figure A: With Radius' Saturn V software, a Rocket card installed in a Quadra appears as a volume icon that opens a window with a complete desktop. Under Saturn V, the Rocket's and the Quadra's 68040 processors remain active.

The 900's interior is divided into two sections, separated by a massive 300-watt power supply. The upper chamber is for storage. A SuperDrive floppy drive is standard, and the interior can accommodate three additional SCSI devices, such as large-capacity hard drives, magneto-optical drives, and CD-ROM drives. The lower chamber houses the motherboard and all the expansion slots.

For all its size, the Quadra 900 comes standard with only 4 megabytes of RAM. However, in addition to the 4 filled SIMM sockets, it has 12 empty ones, for a total of 16 SIMM sockets — enough to increase the RAM capacity to 64 megabytes, given the current capacity of DRAM chips. Once DRAM chips made with true 16-megabit parts start shipping, the RAM limit will increase far beyond 64 megabytes. The Quadra 900's memory controller should be capable of addressing as many as 256 megabytes, although at this writing, Apple hadn't been able to test this ability.

And then there's NuBus. The 900 has five (not six) NuBus slots, and because both Ethernet and video are already on the motherboard, you don't lose a pair of slots just getting the system configured. Thanks to the 900's huge power supply, which looks as though it would be right at home in a Sears DieHard-battery commercial, there's no shortage of power across the bus. The power supply provides enough juice to drive a pair of cards drawing 25 watts each plus three other cards pulling 15 watts apiece, for a maximum load of 95 watts. Not only that, because the 900's case is so big, the NuBus cards can be oversized too — as much as two inches taller than standard NuBus cards, which will encourage the development of complex cards that need a lot of power.

And what would a new Apple CPU be without a new PDS? Not a Mac, that's for sure. Of course, the 68040 processor is significantly different from the 68020 and 68030, so this time, Apple has a legitimate reason to change the PDS (processor-direct slot) design. As with the Mac IIfx, the 900's 140-pin PDS is in line with one of the NuBus slots, which means that if you install a PDS card, you will have one fewer NuBus slot, and vice versa.

Finally, emphasizing its "serverness," the Quadra 900 is the first Mac to come with a key switch. The key, which is inserted in the front of the 900, has three positions: Off, On, and Secure. In the Off position, the 900 can't be turned on, because that position turns the power off immediately — you shouldn't use it when the 900 is operating. The Secure position locks the ADB port and floppy drive, preventing the 900 from being reconfigured or booted from a floppy disk.

As for the Quadra 900's performance as a server, our test results were apparently as much of a surprise to Apple as they were to us. When we used the new AppleShare 3.0, the Quadra 900 was about 25 percent faster than a IIfx. Unfortunately, AppleShare 3.0 was slower than AppleShare 2.0.1 by about the same amount — and 2.0.1 doesn't run on

Table 1: Choosing a Macintosh Quadra

	Pros	Cons	Ideal Uses
Macintosh Quadra 700	•Up to twice as fast as a IIfx. •Ethernet on motherboard. •32-bit-color video on motherboard. •68040 power in a IIci-sized box. •Upgrade path from IIcx or IIci.	•68040 isn't compatible with all software. •Only two NuBus slots.	•High-end publishing. •Compute-intensive tasks such as 3-D rendering or production of large spreadsheets.
Macintosh Quadra 900	•Up to twice as fast as a IIfx. •Ethernet on motherboard. •32-bit-color video on motherboard. •Five NuBus slots. •Up to four internal storage devices.	•68040 isn't compatible with all software. •No upgrade path from IIfx.	•File server. •Compute server. •High-end publishing. •Compute-intensive tasks such as 3-D rendering or production of large spreadsheets.

Figure 2: Performance of the Macintosh Quadra 700

Worse — Better

- DiskBasher 1.0.3
- Excel recalculation
- Illustrator preview
- Photoshop rotate
- StrataVISION 3d ray trace
- Word find-and-change

50%   100%   150%   200%   250%

20-megabyte Mac IIfx, Macintosh Display Card 8•24 gc in 24-bit mode

Quadra 700 performance compared with that of the Mac IIfx
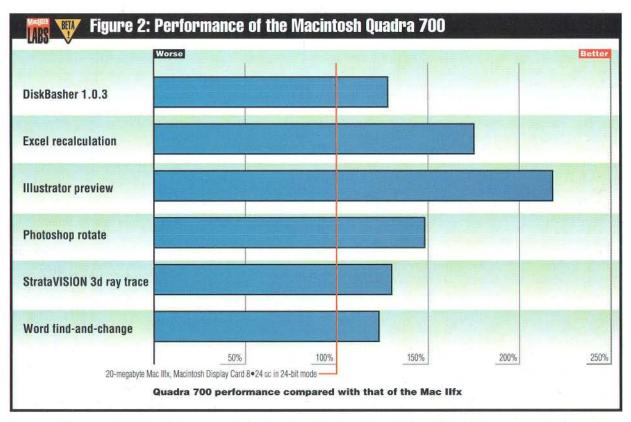
Figure 2: The Quadra series is Apple's first family of 68040-powered Macs. Because the 900 and 700 are functionally identical, the results shown here for the 700 in a single-user desktop environment also apply to the 900 in a similar setting. Overall, the 700 was about one and a half times as fast as a Mac IIfx. A 20-megabyte Quadra 700 running in 24-bit mode with a 300-megabyte FWB drive was used for the tests.

a Quadra at all. The result: If you are running AppleShare 2.0.1 on a IIfx now, upgrading to AppleShare 3.0 running on the Quadra 900 — which everyone's been expecting to be the ultimate power server — probably won't gain you anything in performance. For the specifics on the tests and more on AppleShare 3.0, see "A New Way to Share," in this issue.

The Quadra 700: Faster Than a IIfx

The Quadra 700 is the desktop version of the 900. Its case is the same size and shape as that of a IIci, and although Apple is shipping it set up for vertical positioning, its feet can be moved so that you can place it flat on a desktop. All the essential circuitry, including that for Ethernet and video, is identical to that of the 900, but the 700 has only two NuBus slots and a maximum RAM capacity of only 20 megabytes. As with the 900, however, this is a practical limit caused only by the current unavailability of 16-megabit SIMMs. Once larger-capacity DRAM chips become available, the 700 should be able to address up to 68 megabytes.

Although the 700 is the same size as a IIci, Apple has made one cosmetic change that could cause some problems. On every other Mac with short vertical grooves or slots on the front panel (assuming that the machine is sitting flat on a desktop), the grooves or slots have been positioned along the bottom edge. With the 700, however, Apple has transplanted them to the top of box, which might cause confusion for users of previous Macs, who could mistake the top for the bottom if the machine is positioned vertically. We won't be surprised if Apple gets more than a few angry calls from users who find they've accidentally tried to insert a floppy disk into the drive upside down.

In all our tests, the 700 was at least 23 percent faster than a similarly equipped Mac IIfx, although the amount of performance gain varied substantially from test to test. For example, in the Word find-and-change test, the 700 was a little less than 25 percent faster than a IIfx. For the Illustrator preview, however, it was more than twice as fast. Overall, the 700 was about one and a half times as fast as a IIfx (see Figure 2).

Mac IIcx and IIci owners should be especially pleased with our test results, because unlike their IIfx counterparts, they have an upgrade path. The IIcx or the IIci can be

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Apple's Newest Monitor

In addition to the new computers, Apple has introduced a new monitor. The Macintosh 21" Color Display ($4,599), which has been shipping in Europe for some months, is Apple's first large-screen color monitor. The 1,152-x-870-pixel display has an asymmetrical dot pitch for improved clarity. The vertical refresh rate is 75 hertz, and the screen includes an antiglare treatment.

The monitor includes an automatic degaussing circuit that degausses the screen whenever the system detects the buildup of a magnetic field — it can even degauss if the monitor is tilted or swiveled in such a way that its orientation to the earth's magnetic field changes.
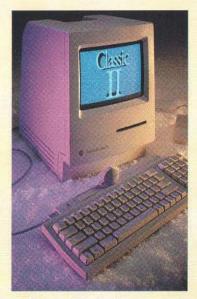
The display includes an integrated tilt/swivel base with an ADB port on the back and a pair of ADB ports on the front. The latter feature makes it possible to plug your keyboard in to the base while keeping your computer on the floor.

Although Apple's 8•24 GC card can drive the 21" at 8 bits, if you want 24-bit color, you'll have to use a third-party card from a company such as Radius, RasterOps, or SuperMac Technology.

Apple's new Macintosh 21" Color Display is the company's first large-screen color monitor. Apple's own 8•24 GC card can drive it at only 8 bits, however, so if you want 24-bit color, you'll have to look to a third-party card.

The Classic II looks just like a standard Classic.

The Classic II is Apple's newest high-performance compact Macintosh. In every respect a Mac Classic, the Classic II is virtually indistinguishable from its predecessor — except that it's nearly twice as fast.

The key to the Classic II's higher performance is its CPU: a 16-megahertz 68030. The debut of this 68030 compact Macintosh spells the end of the line for the orphaned Macintosh SE/30, although that isn't to say that the SE/30 won't be missed. Although the Classic II outperforms the Classic, it pales in comparison with the now-defunct SE/30.

Although the SE/30 and the Classic II use the same type of CPU, the two machines have some fundamental differences. The most important is that the Classic II's data path to RAM is only 16 bits wide instead of 32 bits, as is that of the SE/30, meaning that the SE/30 is twice as fast as the Classic II. In addition, the SE/30 has an open slot that can be used for high-speed networking, making it an excellent server. Unfortunately, Apple maintained the original Classic's slotless design in the Classic II. The reason for the design decision was that basic bottom line: cost. Looking on the bright side, however, Apple now has a 68030 machine that costs substantially less than $2,000 (the SE/30

was priced at more than $3,000).

Physically, the Classic II looks identical to the Classic. It comes in two configurations: with 2 megabytes of RAM and a 40-megabyte hard drive ($1,899) or with 4 megabytes of RAM and an 80-megabyte hard drive ($2,399). The standard ports are available: ADB, two serial (one for LocalTalk), SCSI, audio-in (which the Classic lacked) and audio-out, and a serial port for an external floppy-disk drive. As with the original Classic, a keyboard is included.

The Classic II's motherboard contains 2 megabytes of RAM plus two SIMM sockets for as much as 10 megabytes of additional memory. Apple has included 512K ROM chips on the motherboard, with 32-bit Color QuickDraw in ROM. Unfortunately, the Classic II has no video-out option, so even though the ROMs could support a color or gray-scale monitor, the Classic II can't be connected directly to an external display. Fortunately, most third-party products for getting video out of the PowerBooks also work with the Classic II, and Envisio has a Classic II-specific product (see the "Power Peripherals" sidebar in "Introducing: The PowerBooks," in this issue). As with the PowerBooks, the Classic II doesn't support

Ethernet, but again, several vendors have SCSI-based offerings.

In all our tests, the Classic II was at least 60 percent faster than a similarly equipped Classic. In fact, in every test except the Word scroll, the Classic II was roughly twice as fast as the Classic. As might be expected, the Classic II fared best on CPU-intensive tasks, so, for example, it was a little more than twice as fast as the Classic for the Excel recalculation. What tempers our enthusiasm, however, is that for the same tests, the Classic II's performance was only about half that of an SE/30. Ironically, although the Classic II looks like an SE/30, its architecture and performance are more like those of an LC — in fact, the Classic II was about 10 percent slower than an LC in 1-bit mode.

Assessing the Classic II really depends on your perspective. It provides an excellent performance boost at a minimal additional cost compared with a standard Classic. Owners of standard Classics also have a Classic II option: Apple is offering an aggressively priced ($699) upgrade. Those who were hoping for SE/30 performance and expandability at a Classic price are likely to be disappointed, however.

Classic II performance compared with that of other low-end Macs

*Averaged performance

Figure B: The Macintosh Classic II offers Classic buyers and owners a cost-effective performance boost. Overall, the Classic II is nearly twice as fast as a standard Classic. A 4-megabyte Classic II was used for the tests.

Macintosh Quadras

upgraded to a Quadra 700 for $3,499. We expect that this upgrade will vie with the just-announced upgrade for the Classic as Apple's most popular ever.

The Power of the 68040

With the release of the Quadras, Apple has once again raised the ceiling on Mac computing. Users who were reaching the limits of their desktop machines can look forward to working as they always have — except on a faster Mac.

Plus, with System 7, the Quadras open up entirely new possibilities, the most important of which is distributed processing. Because the hooks are already present in System 7, Apple now has the hardware and software to bring distributed processing to the Mac. Ray Dream and Strata, for example, have already begun demonstrating distributed rendering, in which a single 3-D-rendering job is split into a series of smaller tasks. The tasks are then distributed to several fast machines, each of which does its part of the job. These machines then return the finished tasks to the originating machine, which reassembles them into a single document. With a Quadra on a network, jobs that it would have been ludicrous even to consider performing on a slower machine such as an LC or a IIsi, will now be doable — just launch a task and send it to the faster machine for completion.

The Quadras will be a welcome relief to users who were reaching their computing ceiling and wondering if it was time to move away from the Macintosh. For them, and for those users looking for a high-powered desktop/deskside-

computing solution, Apple's Quadra 700 and 900 should provide a solid foundation on which to build.

Senior editor Russell Ito remembers when the Mac Plus was a speed demon.

Table 2: The Macintosh Quadra 700 and 900

	Macintosh Quadra 700	Macintosh Quadra 900
List price (MB RAM/drive)	$5,699 (4/floppy)	$7,199 (4/floppy)
	$6,399 (4/80)	$8,499 (4/160)
	$6,999 (4/160)	$9,199 (4/400) (due in January)
	$7,699 (4/400) (due in January)	
CPU	25-MHz 68040	25-MHz 68040
RAM	4 – 20 MB	4 – 64 MB
Dimensions (H x W x D, in.)	5.5 x 11.9 x 14.4	18.6 x 8.9 x 20.6
On-board video support	32-bit color with	32-bit color with
	2 MB of VRAM	2 MB of VRAM
Network support	AppleTalk, Ethernet	AppleTalk, Ethernet
No. of internal	1 SuperDrive,	1 SuperDrive,
storage devices	1 hard drive	as many as 3 SCSI devices
Available hard drives	80, 160, 400 MB	160, 400 MB

We asked people
what they wanted from
the next generation
of Apple technology.
They had only
four modest requests.
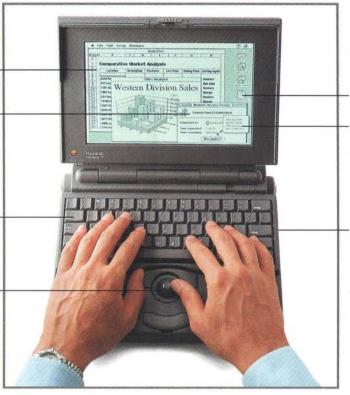
Freedom.

The large, bright, adjustable, backlit Apple PowerBook computer screens offer outstanding resolution.

AppleTalk® Remote Access—plug into the nearest phone line, and you can run your home or office Mac or utilize an AppleTalk network from anywhere in the world.

The full-size PowerBook keyboard is very quiet—so you can use it in meetings or in the library.

The innovative PowerBook design integrates a trackball pointing device and palm rests—it's an extremely comfortable way to work, even in cramped quarters.

A PowerBook lets you work with information from almost any kind of personal computer—Macintosh, MS-DOS or OS/2.

System 7 is standard—Balloon Help,™ file sharing, Publish and Subscribe capabilities and much, much more.

An internal Apple SuperDrive™ disk drive is standard on the PowerBook 140 and 170—an optional external is available for the PowerBook 100.

Comparative Market Analysis

Western Division Sales

PowerBook 100   PowerBook 140   PowerBook 170
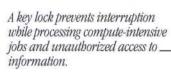
Introducing the Apple PowerBook. It's more than a new computer. It's a new idea. It will let you run Macintosh® software. It will let you run MS-DOS software.* It will let you run away. It can talk to fax machines. It can talk to computers. It can talk. It's easy on your hands. It's easy on your arms. It's easy on your eyes. It's easy. It does more than you imagine. And it costs less than you think. It's the power to work anywhere you want. Anytime you want. In whatever way works best for you. It's the Apple® PowerBook.™ It's freedom.
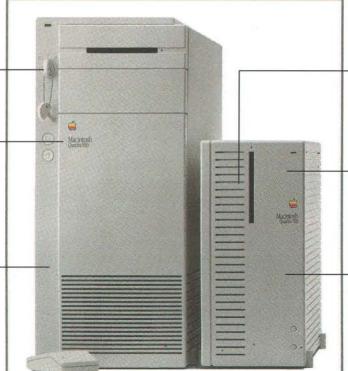
*All you need is a simple program like SoftPC.

Power.

A key lock prevents interruption while processing compute-intensive jobs and unauthorized access to information.

The Macintosh Quadra™ 900 is our most expandable Mac ever (five NuBus slots and room for up to four half-height storage devices)— yet it fits under your desk.

Blistering Motorola 68040 processors deliver up to twice the performance of a Macintosh IIfx.

The first Macintosh computers with built-in Ethernet connections for high-performance networks.

The Quadra 700 is the same size as the Macintosh IIci and IIcx (you'll be able to upgrade either of them).

High-performance video support for every Apple and many third-party displays.*
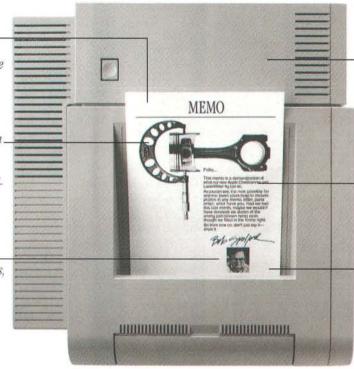
Introducing Macintosh Quadra. A new level of Macintosh computers built around the blistering Motorola 68040 — a single, elegant chip that incorporates a processor, a math coprocessor, a memory controller and dual memory caches. And supported by high-performance subsystems across the board: built-in 24-bit video support, built-in Ethernet networking, plus much faster SCSI and NuBus™ capabilities. It's blistering speed for your hottest ideas. Brute force with impeccable manners. The power to be your best.®

*With optional video RAM, 24-bit support for monitors up to 16", 8-bit support for monitors up to 21". Pump image was created by Joe Guagliando with MacBRAVO! MacBRAVO! is a registered trademark of Schlumberger Technologies, Inc.

Simplicity.

With the Apple OneScanner,™ its Ofoto™ software, a LaserWriter IIf or IIg and any Macintosh, anyone can create memos like this.

Apple's PhotoGrade technology is a major breakthrough in printing technology that reproduces the subtle tones of gray in black-and-white photographs.

If you can see it, you can scan it. Photos, illustrations, small objects, even your signature.

A Motorola 68030 microprocessor and plenty of memory (expandable to 32MB) provide plenty of power for graphics-intensive pages. The LaserWriter IIg also has built-in Ethernet for high-performance networks.

Razor-sharp text and graphics are the result of Apple's new FinePrint™ technology.

PhotoGrade technology allows the new LaserWriter printers to produce pages which rival the print quality of 800-dpi printers costing much more.

MEMO
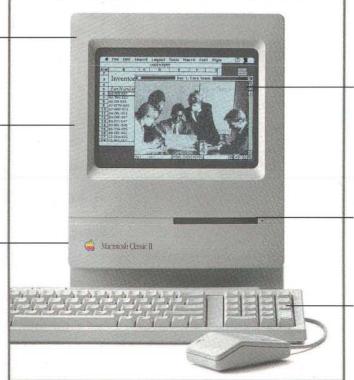
Introducing the Apple OneScanner and Apple LaserWriter IIf and IIg. Combined with any Macintosh, our new scanner lets you add 300-dpi black-and-white photographs to any memo, letter or proposal with just one touch of a button. Click again, and you can print your work in stunning, high-resolution gray-scale—thanks to the PhotoGrade™ technology built into our new LaserWriter® printers. It's easy. It's fast. It's affordable. It's a whole new way to communicate. A power you get only on a Mac.® The power to be your best.®

The LaserWriter IIf requires an additional 4MB of memory to take advantage of PhotoGrade.

Humanity.

Up to twice the performance of a Macintosh Classic—yet it costs just a few dollars more.

The Macintosh Classic II is expandable to 10MB of memory and 80MB of internal hard disk storage.

Sound input and output ports, and a microphone, are standard.

A Motorola 68030 processor supports all System 7 features— including virtual memory.
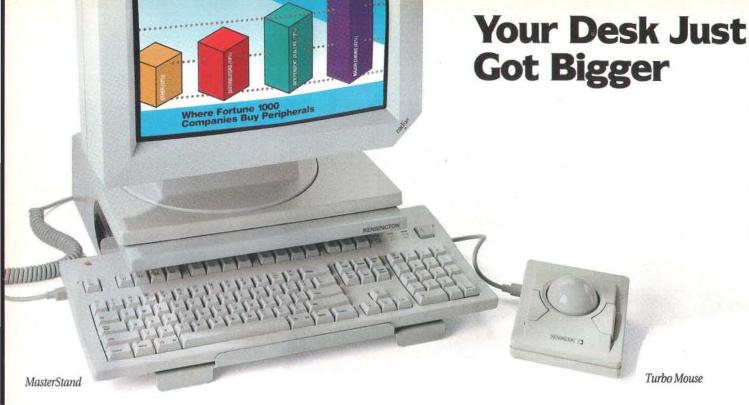
The Apple SuperDrive disk drive reads to and writes from Macintosh, MS-DOS, Apple II and OS/2 formatted disks.

A full-size keyboard is standard.

Introducing the Macintosh Classic II. The new Macintosh Classic® II is up to twice as fast as its best-selling predecessor. Yet it costs just a few dollars more. It's easy to set up. It's easy to use. It runs thousands of Macintosh business and educational programs. It supports System 7 features like virtual memory. And it's available today, along with all the other exciting Apple products you've read about, at an authorized Apple reseller near you. Stop in and discover the new power of Apple technology. The power to be your best.®

Your Desk Just Got Bigger

MasterStand

Turbo Mouse

Kensington introduces MasterStand and LaserStand to its complete line of space savers.

The more stuff we put on our desk the smaller it seems to get.

And with a CPU, keyboard, monitor, printer and mouse, there's hardly room left for anything else.

But don't give up. You can make your desk bigger with one, or a combination of space saving products from Kensington.

MasterStand™ saves space by letting you slide your keyboard underneath your Mac or large screen monitor. It even turns a narrow desk, credenza or file cabinet into a workstation by extending the keyboard eight inches.

Want to store all your LaserWriter® II supplies in one convenient place?

With *LaserStand*, there's room on one end for two reams of paper and up to 75 envelopes. The other end *(not shown)* holds two extra paper trays. And a convenient side compartment protects, organizes and hides printer cables.

For dot matrix printers, our *Space Saving Printer Stand* is the answer for maximum storage with a minimum footprint.

Space Saving Printer Stand

And our award winning *Turbo Mouse*® saves even more space with its superior trackball design.

Unlike many accessories, all Kensington products look like they belong to your Mac. The styling is complementary. The color identical. Even the same material is used.

For a free brochure on our complete line of space saving products, including *Keyboard Shelf, Keyboard Slideaway*®, *Maccessories*® *Tilt/Swivel* and *SuperBase*®, call 800-535-4242. Outside the U.S. 415-572-2700.

Keyboard Shelf

LaserStand

KENSINGTON®

The MacUser 100

Looking for something marvelous — or just a little offbeat — for your Mac? Here are 100 products guaranteed to satisfy your every whim, and at less than $250 each, the price is right.

Most of the year, *MacUser* concentrates on business-oriented products such as word processors, spreadsheet programs, hard-disk drives, and printers. But all work and no play is, well, boring. To liven things up, we've rounded up 100 products guaranteed to be entertaining, practical, or just plain strange, and each one costs less than $250. The choices range from tried-and-true utilities to off-the-wall accessories, from classics for your Mac Classic to Mac-assisted classical music. To round out the list, we asked contributing editors Steven Bobker and Bob LeVitus as well as some of the luminaries on the *MacUser* staff what Mac essentials they'd pack for a trip to a desert island. All these products should be available by the time you read this.

So, if you have the urge to splurge on that special Macophile — including yourself — you're sure to find inspiration in the *MacUser* 100. For still more ideas, see the August '91 issue, which contains the complete MiniFinders section, comprising synopses of 1,000 previously reviewed products.

BY VICTORIA VON BIEL, BRUCE MEWHINNEY, MICHELE HASSON, AND GREGORY WASSON

The MacUser 100

GENERAL INTEREST

1 At Your Service

One of the most unusual products you might install on your Mac, At Your Service uses a digitized image of a guy named Phil who verbally greets you when you switch on your Mac. Phil also reminds you of appointments, tells you when it's time to take a break, alerts you when E-mail arrives, and so on. In case you tire of Phil, Bright Star offers registered users a choice of other personalities. Bright Star Technology, 1450 114th Avenue S.E., Suite 200, Bellevue, WA 98004; (206) 451-3697. $59.95.

2 AutoMizer

This handy HyperCard stack, referred to as a vehicle-management system, helps monitor your car's performance. Use it to track mileage, remind yourself of routine service appointments, and keep tabs on maintenance expenses. Because most of us don't keep a Mac in the car, AutoMizer includes a notebook and carrying case for recording information manually. Another nice feature is the tax tracker, which is handy for people who use their car for business. Four Peaks Intelligent Systems, P.O. Box 1837, Chandler, AZ 85244; (800) 553-0363 or (602) 545-7008. $29.99.

3 BannerMania

Create eye-catching banners for any occasion, using BannerMania's 50 banner templates. You can create custom banners with the program's various fonts, shapes, and special effects. When completed, your giant messages print smoothly in color or black-and-white. Brøderbund Software, 17 Paul Drive, San Rafael, CA 94903; (800) 521-6263 or (415) 492-3200. $59.95.

4 Calc+

DTP and spreadsheet-program users should like Calc+, a handy feature-packed calculator DA from the company that created CanOpener and Cheshire. Calc+ offers a multiline display that can be resized, scrolled, and edited. It can perform calculations in (and convert among) inches, centimeters, picas, and ciceros. Keep the Calc+ icon on your Mac's desktop for easy access. Abbott Systems, 62 Mountain Road, Pleasantville, NY 10570; (800) 552-9157 or (914) 747-3116. $79.

5 CalenDAr
6 First Things First

If you need a quick and easy way to record appointments and to-do lists, both CalenDAr and First Things First can get the job done. CalenDAr is a DA with lots of features: Besides letting you set reminders, it has excellent on-line help, and you can record your own alarm sounds. Its only drawback is cumbersome printing. Psybron Systems, Inc., P.O. Box 431, Charleston, WV 25322; (800) 866-4260 or (304) 340-4260. $49.95.

With fewer features than CalenDAr but the same convenience, First Things First is an INIT that puts a 1-inch-square clock/day calendar on-screen. Double-click on the clock, and the reminder pad appears. It's simple and effective. Visionary Software, Inc., P.O. Box 69447, Portland, OR, 97201; (800) 877-1832 or (503) 246-6200. $69.95.

7 FontMonger

FontMonger is a nifty type tool that lets you add small caps, fractions, and other custom characters to a font. You can combine characters from different typefaces into a single font. You can export characters as PICT or EPS outlines and turn EPS artwork (such as logos) into font characters. Last but certainly not least, you can convert fonts among Type 1, Type 3, and TrueType formats. Ares Software, 561 Pilgrim Drive, Suite D, Foster City, CA 94404; (415) 578-9090. $99.95.

8 For the Record

This package from Nolo Press helps you get all your personal records organized. Use it to compile a detailed inventory of your possessions, record the whereabouts of legal papers and insurance records, and keep track of family information and history. To be superorganized, use For the Record with your personal-finance software. Nolo Press, 950 Parker Street, Berkeley, CA 94710; (800) 992-6656 or (510) 549-1976. $59.95.

9 MindSet

MindSet is an INIT that brings a little New Age wackiness to the business world by flashing a variety of inspirational sayings and affirmations on your Mac's screen while you work. You can even add your own messages if the hundreds provided, which cover such topics as procrastination and self-esteem, aren't enough. Visionary Software, Inc., P.O.

Skyclock Solar is a new way of telling time from your Macintosh. If you make many long-distance phone calls, it's also a great way to find out the time and area code in such exotic places as Kyoto, Auckland, or Buenos Aires, to name a few. Skyclock Co., Box 401, Milford, MI 48381; (313) 684-2632. $64.95.

14 TeleFinder Pro

TeleFinder Pro is an ideal entry-level telecommunications package — it's inexpensive and easy to use and makes good use of the Macintosh's graphical user interface. You can use it to connect to another Macintosh, a TeleFinder bulletin-board service, or commercial services such as CompuServe and GEnie. Spider Island Software, 4790 Irvine Blvd., Suite 105-347, Irvine CA 92720; (714) 669-9260. $79.95.

15 ThoughtPattern

If you wish there were electronic Post-it notes and index cards for the Mac, check out ThoughtPattern. This program lets you file information as formally or informally as you wish. Laid out like a series of index cards, ThoughtPattern lets you cross-index notes, mix files and notes, and set alarms. Bananafish Software, 730 Central Avenue, San Francisco, CA 94117; (415) 929-8135. $149.95.

16 WritePro

This unusual program is aimed at fiction writers and wannabe writers. It's a well-executed tutorial that shows you how to master the art of creating characters, plotting a story, and writing dialogue. Depending on your experience, you can work through the whole program or start with any one of four modules. The WritePro Corp., 43 Linden Circle, Scarborough, NY 10510; (800) 755-1124 or (914) 762-1255. $99.95.

UPDATED CLASSICS

17 More After Dark

A screen saver can help prevent phosphor burnout on your monitor, and the After Dark package lets you have a little fun in the process. More After Dark includes more than 25 new modules, including Mower Man and Lunatic Fringe (an arcade-style space game). It also has a version of Virex, which checks your system for viruses while your screen sleeps. It requires After Dark 2.0 to run. Berkeley Systems, Inc., 2095 Rose Street, Berkeley, CA 94709; (510) 540-5535. $39.95; bundled with After Dark 2.0, $69.95.

18 Now Utilities 3.0

This popular collection of ten utilities for the Mac is just as useful under System 7 as it was under System 6. Our favorites? Super Boomerang, which gives you direct access

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Box 69447, Portland, OR, 97201; (800) 877-1832 or (503) 246-6200. $60.

10 Movies, Movies, Movies

Movies, Movies, Movies can end your days of wandering around a video store in a fog. This set of text files gives you cast, director, year released, quality, and plot information for more than 2,400 movies. You can view the files with a word processor, or you can import them into a database — templates are provided for HyperCard, 4th Dimension, File Force, FileMaker Pro, and Panorama. MacKay Associates, 6439 Boxelder Drive, Lincoln, NE 68506; (800) 829-6753 or (402) 486-3550. $35; updates (available each spring), $15.

11 The Nutrition Stack

If you want your Mac to help monitor your eating habits, this program may be just what you need. The HyperCard-based Nutrition Stack keeps track of vitamins, minerals, fats, carbohydrates, calories, fiber, and all the other things you eat. Check out a disabled demo version on CompuServe (HyperCard Forum Library 3), America Online, and GEnie (HyperCard Library 15). Big Byte Software, 25 Blake Street, Needham, MA 02192; (617) 444-3028. $79.

12 Report Ideas

Stuck for just the right phrase when composing a presentation? Report Ideas is a DA that takes the sweat out of business writing by providing a database of hundreds of phrases (such as "In summary, the experiment described below analyzes...") that you can paste into a document and alter as needed to fit your project. The resulting prose won't win a Pulitzer prize, but you can certainly turn out a professional-sounding document. Intelligence Active Software, 6070 Business & Technology Center, Macomb, IL 61455; (800) 344-0571 or (309) 833-5959. $125.

13 Skyclock Solar

Basing its calculations on the rising and setting of the sun,

to favorite files and folders from the Apple menu and the Open and Save dialog boxes; NowMenus, which gives you five levels of submenus for Apple menu items; and StartUp Manager, which lets you control the order in which INITs load. Now Software, Inc., 520 S.W. Harrison Street, Suite 435, Portland, OR 97209; (800) 237-3611 or (503) 274-2800. $129.

19 QuickDEX II

Using the QuickDEX II DA is one of the most convenient ways to store and access names and phone numbers. This updated classic is superfast, but it's definitely without frills — you can't sort records or print envelopes. (If you want these features, look for companion products PrintDEX II and QuickElope.) Casady & Greene, 22734 Portola Drive, Salinas, CA 93908; (800) 359-4920 or (408) 484-9228. $60.

20 Quicken 3.0

One of the most popular personal and small-business financial-software packages, Quicken is available in a new and much improved version. Probably its best feature is its simplicity — if you know how to use a Mac and a checkbook, you'll feel right at home with Quicken. Use it to write and record checks, balance your checkbook, and even pay your bills with the CheckFree electronic service and your modem. Intuit, P.O. Box 3014, Menlo Park, CA 94026; (800) 624-8742 or (415) 322-0573. $69.95.

21 QuicKeys 2.1

The fastest way to become a power user is to discover macros, and one of the easiest ways to do that is by using a macro-making program such as QuicKeys 2.1. This new version is System 7-savvy, letting you take control of applications that support Apple events. More importantly, QuicKeys lets you streamline your work by assigning key commands to frequently performed tasks. CE Software, 1801 Industrial Circle, P.O. Box 65580, West Des Moines, IA 50265; (800) 523-7638 or (515) 224-1995. $149.95.

22 Suitcase II

Sure, System 7 handles fonts differently and DAs are a thing of the past, but you still need Suitcase II. It works the same way it did under System 6: You can easily store and access fonts (both Type 1 and TrueType) and sounds. At press time, the latest version was 1.2.11, and updates are posted on on-line services such as CompuServe and America Online. Fifth Generation Systems, 10049 N. Reiger Road, Baton Rouge, LA 70809; (800) 873-4384 or (504) 291-7221. $79.

23 SAM (Symantec Anti-Virus for Macintosh) 3.0

One of the most full-featured antiviral packages around, SAM has been revamped for use with Macs running under System 7. The program includes SAM Intercept, which automatically scans floppy disks when they're inserted, and SAM Virus Clinic, which lets you repair or delete infected files immediately. Symantec offers a Virus Bulletin Board that gives you information to update your copy of SAM as new viruses appear. Symantec Corp., 10201 Torre Avenue, Cupertino, CA 95014; (800) 441-7234 or (408) 253-9600. $99.

UTILITIES

24 DiskLock

Using passwords and encryption, this security program protects the contents of your hard disk. DiskLock isn't particularly fast or loaded with fancy features (there are no customizable user levels, for example), but it won't surprise you by losing or corrupting data. Fifth Generation Systems, 10049 N. Reiger Road, Baton Rouge, LA 70809; (800) 873-4384 or (504) 291-7221. $189.

25 Freedom of Press Light

Freedom of Press is an application that generates PostScript-quality output on non-PostScript printers. This scaled-down version supports fewer printers and comes with fewer fonts than its big brother, but it's still a valuable

tool. Your printer's resolution is the only limit to output quality. Freedom of Press Light supports PostScript Type 1 fonts and ATM. Custom Applications, Inc., 900 Technology Park Drive, Building 8, Billerica, MA 01821; (508) 667-8585. $98.

26 HAND-Off II

This updated utility's SuperMenu option offers pop-up hierarchical menus for folders, aliases, documents, and applications accessed via the Apple menu. There's also a function that groups applications and documents for simultaneous launching. Like previous versions, HAND-Off II can automatically find and launch a substitute application when a document's creator program is missing. Connectix Corp., 2655 Campus Drive, San Mateo, CA 94403; (800) 950-5880 or (415) 571-5100. $99.

27 Help!

28 MacEKG

These two utilities can cover most of your hardware and software troubleshooting needs. Use Help! as a replacement for Apple's System 7 Compatibility Checker. It uses a built-in "expert system" database to recommend solutions for incompatibilities, and results can be printed as complete reports or exported as text. Teknosys, 3923 Coconut Palm Drive, Suite 111, Tampa, FL 33619; (800) 873-3494 or (813) 620-3494. $149; annual update, $75.

MacEKG is an INIT/control panel that automatically diagnoses software and hardware problems on your Mac when you start up. It evaluates logic-board, SCSI, and QuickDraw performance as well as software conflicts. It saves the test results and compares them with stored data on standard systems. You can export the results to a spreadsheet or database program for further analysis. MicroMAT Computer Systems, 7075 Redwood Blvd., Novato, CA 94945; (415) 898-6227. $99.

29 Last Resort

Last Resort is aptly named — it's a utility that lets you retrieve text documents you've deleted or never saved. It works in the background, saving your keystrokes to a separate document. If your Mac crashes or you accidentally delete your work, you can open this file with your word-processing program. Working Software, Inc., P.O. Box 1844, Santa Cruz, CA 95061; (408) 423-5696. $49.95.

30 Peacock

Several companies have introduced "tool kit" stacks that let moderately skilled HyperCard users create business-oriented applications without getting bogged down in HyperTalk scripting. Peacock concentrates on sophisticated record sorting, text importing/exporting and filtering,

and automated field and record analysis. It's ideal for a small project such as creating a mailing list. Cyan Software, P.O. Box 28096, Spokane, WA 99228; (509) 238-6789. $69.

31 SuperDuper 1.5

Usually the Mac is paralyzed when it copies floppies. Not so with SuperDuper 1.5, a utility that duplicates disks much faster than the Finder — and works in the background. SuperDuper works with all standard internal or external floppy-disk drives as well as with floppy-disk auto-loaders such as those from Fifth Generation and Douglas. Compatible with Macs from the Plus up to (but not including) the IIfx. NeoConcepts, P.O. Box 6883, Salinas, CA 93912; (408) 899-4821. $79; auto-loader version, $150.

32 Traffic Controller Personal

If you're using one of the few programs that has System 7 publish-and-subscribe capabilities, Traffic Controller Personal can help you keep track of all the published editions. Traffic Controller tells you the name, size, and type of each edition; when an edition is updated; and whether it is orphaned. Tactic Software Corp., 11925 S.W. 128th Street, Miami, FL 33186; (800) 344-4818 or (305) 378-4110. $129.

33 TwinIt

You can back up entire hard-disk drives automatically with TwinIt, a software product that continuously writes data to two SCSI drives simultaneously, even if the drives are from different manufacturers. Compatible with System 7 and AppleShare, the program preserves AppleShare access privileges on the twin (backup) drive. TwinIt is also compatible with E-mail servers. Golden Triangle Computers, 4849 Ronson Court, San Diego, CA 92111; (619) 279-2100. $249.

34 Word for Word/Mac

In the business world, the ability to take nasty DOS word-processor or spreadsheet files and convert them into clean, formatted Mac documents can be a real lifesaver. Word for Word/Mac is one of the best programs at this sort of thing, offering fast, accurate conversions among 5 popular Mac formats and 25 PC formats. Software Toolworks, 60 Leveroni Court, Novato, CA 94949; (800) 231-3088 or (415) 883-3000. $149.95.

HARDWARE

35 Curtis Command Center

The Curtis Command Center is a sleek panel with four AC outlets that offer power-surge protection for your Mac and peripherals. You also get modem- and fax-line protection, a heavy-duty 8.5-foot power cord, a nonmagnetic disk-storage compartment, and a circuit breaker. Curtis Manufacturing Co., 30 Fitzgerald Drive, Jaffrey, NH 03452; (800) 548-4900 or (603) 532-4123. $149.95.

36 EZ Music Starter Kit

For those who have a MIDI synthesizer, the EZ Music Starter Kit provides everything necessary to make music on the Mac. The Kit bundles EZ Vision (a sequencing program for recording and editing), MIDI Translator (a three-output MIDI interface), and the Book of MIDI (a HyperCard tutorial). You also get membership in PAN, the musicians' bulletin-board service. Opcode Systems, Inc., 3641 Haven Drive, Suite A, Menlo Park, CA 94025; (415) 369-8131. $200.

37 Gold Brick

If the Mac's mouse-driven interface revolutionized computing, why does the younger generation consider it so prosaic? Kids have grown up thrashing Nintendo games, which use input devices such as Mattel's Power Glove and Brøderbund's UFORCE. Now you can use these control-lers on your Mac by installing a Gold Brick interface and its control-panel software. Transfinite Systems, P.O. Box N, M.I.T. Branch Post Office, Cambridge, MA 02139; (617) 969-9570. The Nugget (user model), $169; developer model, $245.

38 Grizzly Bit

Old ImageWriters never die, they just become low-rent scanners (remember ThunderScan?) or — now hear this — photographers' aids. Grizzly Bit is a print-head upgrade for the ImageWriter II that lets you print gray-scale scanned or computer-generated images on photographic paper — under darkroom conditions, of course. The potential resolution is 144 dots per inch, using eight levels of gray or 248 dithered patterns. Terramark, Inc., One Fitchburg Street, Suite B353, Somerville, MA 02143; (617) 623-6710. $199.

39 Little Mouse

If you'd like something more compact, easily controlled, and dust-resistant than Apple's generic mouse, try the elegant Little Mouse and its Precision MousePad. Using optical sensors, this input device is 22 percent smaller and 38 percent lighter than the Apple rodent but offers 50-percent-higher resolution. Mouse Systems, 47505 Seabridge Drive, Fremont, CA 94538; (510) 656-1117. $129.95.

40 MacMike

41 Mitshiba StereoRecorder

Mac products for digital sound editing are rapidly becoming affordable and easy to use. MacMike is a low-cost voice digitizer that connects to any serial port. It's bundled with SoundPad, voice-memo software that lets you record, play back, and save voice memos from within any application. Premier Technology, 1072 Folsom Street, Suite 456, San Francisco, CA 94103; (800) 622-6453 or (415) 255-9300. $59.95.

The Mitshiba StereoRecorder creates stereo sound files accessible by any software that uses Apple's Sound Input Manager standard. A microphone is included, along with SoundMan and SoundMover editing and mixing software. Tactic Software Corp., 11925 S.W. 128th Street, Miami, FL 33186; (800) 344-4818 or (305) 378-4110. $249.

42 MacSpeaker MS-1

Computers come with inexpensive little speakers so they can beep and chatter at appropriate times, but serious sound requires serious speakers. A Mac's mono or stereo output jack can drive a pair of high-fidelity MacSpeakers directly; you can also hook them up to MIDI synthesizers or CD-ROM or videodisc players. Monster Design, 274 Wattis Way, South San Francisco, CA 94080; (415) 871-6000. $229.95 per pair.

43 R•G•P LaserPointer

Mac-controlled video-projection systems are becoming popular for business presentations, but it can be difficult to point to areas of a projected image. That problem is solved with R•G•P LaserPointer, a pen-sized device that sends a red pinpoint of light to a screen as far as 500 feet away. Really Great Products, 1475 Old County Road, Suite 1, Belmont, CA 94002; (415) 508-0898. $149.

44 Silhouette

The Silhouette optical trackball has a curvaceous case that lets users grasp the trackball between thumb and finger. Optical sensors and four colored balls of different weights provide customizable cursor control. With the included software, one of the trackball's three buttons can be programmed to do such things as cut and save. EMAC (Everex Systems), 48431 Milmont Drive, Fremont, CA 94538; (800) 821-0806 or (510) 498-1111. $99.95.

45 Thumbelina-Mac

If small is beautiful, then Thumbelina-Mac is the fairest trackball of them all. Only three-quarters of an inch high, it has two input buttons and a drag-lock button. Attach this little gizmo to the corner of any keyboard with either its mounting pad or its clip-on bracket. Appoint, 1332 Vendels Circle, Paso Robles, CA 93446; (805) 239-8976. $99.

CHILDREN AND EDUCATION

46 Global Recall

Global Recall is a HyperCard interactive atlas. By clicking on different maps and views, you can learn the population of the world, the age of the earth (4.5 billion years old on its last birthday), and some vital statistics (AIDS cases by country or continent, for example). World Game Institute, 3508 Market Street, Philadelphia, PA 19104; (215) 387-0220. $85.

47 Johannes Brahms: A German Requiem

If you have a CD-ROM player, you can enter music's Romantic era with Brahms' *A German Requiem.* Use the CD-ROM to learn the English and German texts, analyze the music, gain historical and musical insights, and browse through an illustrated Brahms biography. Warner New Media, 3500 Olive Avenue, Suite 1050, Burbank, CA 91505; (818) 955-9999. $66.

48 Monarch Notes CD-ROM

Just in time for spring finals comes the CD-ROM version of Monarch Notes, the classic cramming tool for literature students. The CD-ROM includes every Monarch Note ever published (covering more than 112 authors), along with author biographies, overviews of literary styles, critical commentaries, and pictures. Bureau of Electronic Publishing, 141 New Road, Parsippany, NJ 07054; (201) 808-2700. $99.

49 New Math Blaster Plus!

In this politically correct program for kids aged 6 through 12, watch Blasternaut and his robot friend Spot save the universe, recycle garbage, and teach basic math. There are four games and different levels to choose from — in all of them, Blasternaut and Spot soar through space to attack trash aliens and teach problem-solving skills along the way. Davidson & Associates, Inc., 3135 Kashiwa Street, Torrance, CA 90505; (800) 556-6141 or (310) 534-2250. Single-user version, $59.95; classroom edition, $179.95.

50 Spelunx and the Caves of Mr. Seudo

The creators of Cosmic Osmo have done it again, with Spelunx and the Caves of Mr. Seudo, an educational game

for kids aged 5 and up. Ride down to the caves to discover a world of interesting objects that do all sorts of things when you click on them. Climb out of the cave to the Pondering Seudo Scope, and play with the planet finder, which locates planets, stars, and satellites. Brøderbund Software, 17 Paul Drive, San Rafael, CA 94903; (800) 521-6263 or (415) 492-3200. $49.

51 Student's Writer's Dream Tools 2.0

This collection of five HyperCard stacks includes hundreds of words, phrases, and facts that are useful for researching and writing history, English, and other school papers. The Slang Thesaurus contains up-to-date vocabulary that may be inappropriate for young children, so beware! Slippery Disks, P.O. Box 1126, Los Angeles, CA 90069; (800) 522-7234 or (213) 274-3600. Five-disk set, $149; three-disk set, $89; individual stack, $35.

52 Swamp Gas

Swamp Gas is an alien creature who visits the U.S. and needs help finding his way around. Children six years and older can help him find states, capitals, cities, and landmarks. When a mission's accomplished, kids can visit the Alien Arcade to play Nerdoids, Quasar Klutzes, or Stink Snakes of Saturn. Inline Design, 5 W. Mountain Road, Sharon, CT 06069; (203) 364-0063. $49.95.

53 Talking Reader Rabbit 3.0

Children aged 3 to 7 can explore colorful pictures with sound and animation in four games that teach spelling, reading, concentration, and vocabulary skills. Reader Rabbit dances when you choose the correct answer and says "uh-oh" when the answer is wrong. The Learning Company, 6493 Kaiser Drive, Fremont, CA 94555; (800) 852-2255 or (510) 713-0230. $69.95.

ACCESSORIES

54 3M Head Cleaning Diskette Kit

Dust is bad for your floppy-disk drive, and Apple recently told dealers and service centers that cleaning the SuperDrive with 3M's floppy-drive cleaning kit (which you moisten with cleaner and insert into the drive) can prevent the need for repairs. It also works on 800K drives. At press time, the 3M package was the only drive-cleaning kit recommended by Apple. 3M Corp., 3M Center, St. Paul, MN 55144; (800) 362-3456 or (612) 733-1110. 10-cycle kit, $9.95; 13-cycle kit, $19.95.

55 After Dark Flying-Toaster Tie

The ultimate Mac accessory (dare we say *softwear?*) for those special occasions is the After Dark flying-toaster necktie. Tiny toasters fly discreetly across a background of navy, red, forest green, or burgundy. This is a must for the

well-dressed nerd. Berkeley Systems, Inc., 1700 Shattuck Avenue, Berkeley, CA 94709; (510) 540-5535. $17.95.

56 Color Ink Refills

If you have a StyleWriter or an HP DeskJet printer and would like to make your presentations a bit more colorful, you can refill empty ink cartridges with blue, red, green, violet, brown, or indelible black ink. Filling the cartridges is easy — simply squeeze the colored ink into the cartridge, using the supplied nozzle. Graphic Utilities, Fort Fairfield, ME 04742; (800) 669-4723 or (617) 890-1818. Black, $19.95; other colors, $20.95 each.

57 Curtis Apple Security Kit

If you want to keep your Mac where it belongs, the Apple Security Kit is an inexpensive and easy way to protect your investment. A security cable and padlock secure the computer, keyboard, and peripherals to a desk: You remove the cable with the special wrench that's provided with the package. Curtis Manufacturing Co., 30 Fitzgerald Drive, Jaffrey, NH 03452; (800) 548-4900 or (603) 532-4123. $29.95.

58 Diskette Travel Wallet

Here's how to safely transport disks for demos or presentations away from the office: a disk carrying case that not only keeps your disks clean and organized but also has a built-in antimagnetic shield that reduces the chances of X-ray damage from airport security checks. Holds a dozen 3.5-inch disks. Viziflex Seels, 16 E. Lafayette Street, Hackensack, NJ 07601; (201) 487-8080. $14.95.

59 KleenLaser

Dust, dirt, and leftover toner can cause your laser printer to turn out poor-quality copies. To clean your printer for optimum performance, use KleenLaser — a sheet of syn-

made out of 3.5-inch floppy disks, CD-ROMs, or CDs. Both run on standard AA batteries and can be hung on the wall if you run out of desk space. If you're feeling creative and have a spare CD-ROM lying around the office, make your own clock with the TimeDisc Kit, which includes all the mechanical parts plus instructions. TimeFrame Products, 115 Fayerweather Street, Cambridge, MA 02138; (617) 876-5225. Clock, $19.95; kit, $14.95.

64 Wacky Vac

If your keyboard is starting to look a bit crummy, you need the Wacky Vac vacuum-cleaner attachment. With its 25 small suction tubes and soft filament brushes, the Wacky Vac attachment can clean Twinkie residue out of most nooks and crannies. Two adapters are included, so you can use the Wacky Vac with most canister vacuum cleaners. IdeaWorks, 74-940 Highway 111, Suite 121, Indian Wells, CA 92210; (619) 773-2653. $9.99.

GAMES

65 3 in Three

Mac gamers speak reverentially about Fool's Errand, by Cliff Johnson. His latest game, 3 in Three, offers even more entertainment. In the animated Prologue, the number 3 gets zapped off a spreadsheet by a power surge and, with your help, maneuvers through logic dilemmas, word puzzles, and sinister brain twisters. Inline Design, 5 W. Mountain Road, Sharon, CT 06069; (203) 364-0063. $49.95.

66 Falcon 2.2

This classic F-16A-fighter-simulation game can fly in any Mac from a humble Plus to RAM-crammed color machines. The networkable version 2.2 lets you take on other top guns in the office, using the same AppleTalk network that handles your printing jobs. Spectrum HoloByte, 2061 Challenger Drive, Alameda, CA 94501; (510) 522-3584. $59.95.

67 Glider 4.0

With Glider, you navigate a computer-generated paper airplane through an on-screen mansion filled with bookshelves, fishbowls, staircases, toasters, wall sockets, and even a deadly paper shredder. The Room Editor lets you invent your own hazardous flight plans. Casady & Greene, 22734 Portola Drive, Salinas, CA 93908; (800) 359-4920 or (408) 484-9228. $49.95.

68 Hardball II

The latest version of this best-selling baseball classic adds features such as multiple-field views; league play; instant replay; and Team Editor, for creating dream teams or replicating real-life major-league lineups. You can choose among accurately simulated stadiums of cities such as

thetic material you feed through the printer's manual-feed section. AudioSource, 1327 N. Carolan Avenue, Burlingame, CA 94010; (415) 348-8114. $24.95.

60 KeyCappers

Can't remember the key combinations for bullets or daggers? KeyCappers are transparent keyboard labels that show the standard additional characters created with the Option and Shift-Option keys. Stick them on the appropriate keys, and never use the Key Caps DA again. PowerByte, Inc., P.O. Box 20509, Dag Hammarskjold C.C., New York, NY 10017; (212) 472-5874. $19.95.

61 Madson Carrying Cases

Last year The Madson Line released its carrying case for the Mac Portable, which has detachable pouches for an AC power adapter and battery pack. The case can also be used as a portable desk. This year Madson has released more carrying cases, including ones for the Classic, LC, and IIsi as well as for 13-inch monitors and the Hewlett-Packard DeskWriter. The Madson Line, P.O. Box 338, Corte Madera, CA 94976; (800) 851-1551 or (415) 927-3600. $69 to $347.

62 The PaperKit

Paper Direct is a mail-order company that specializes in supplying unusual laser paper (including recycled) in small quantities. One of its best deals is The PaperKit, which contains 150 paper samples in a range of colors and styles as well as a swatch book of all of Paper Direct's papers. Paper Direct, 57 Romanelli Avenue, South Hackensack, NJ 07606; (800) 272-7377 or (201) 507-5488. $20.

63 PC TimeDisk and the CD TimeDisc Kit

If you're looking for a DA that's really for your desk, try the PC TimeDisk or the CD TimeDisc. These clocks are

Boston, Kansas City, Chicago, New York, San Francisco, and Toronto. Accolade, 550 S. Winchester Blvd., Suite 200, San Jose, CA 95128; (800) 245-7744 or (408) 985-1700. $54.95.

69 Nobunaga's Ambition

Japanese political history grew from a complex military history, and the great lords (daimyos) of medieval Japan had to master more than just battlefield pyrotechnics if they wanted to consolidate power among their local fiefdoms. Based on real characters and locations, Nobunaga's Ambition is astoundingly rich in historical detail. The game design is strong on strategy rather than arcade-style ninja gymnastics. KOEI Corp., One Bay Plaza, Suite 540, 1350 Bayshore Highway, Burlingame, CA 94010; (415) 348-0200. $59.95.

70 Oids

Unlike most action games, which reward your ability to destroy an enemy, Oids credits your ability to act as a rescuer. You must save tiny enslaved Oids from hostile planets bristling with missiles and artillery. One of the best Mac arcade-style games, Oids is limited to black-and-white or 16 colors, but it's usable on a 1-megabyte machine and its Game Editor lets you create new game scenarios. Software Heaven (FTL Games), 6160 Lusk Blvd., Suite C206, San Diego, CA 92121; (619) 453-5711. $44.95.

71 PlayMaker Football

PlayMaker Football is every armchair quarterback's fantasy: a game-design chalkboard that controls what the players do on the field. Options include team creation, player-characteristics adjustment, and the ability to customize game strategies for later use. Brøderbund Software, 17 Paul Drive, San Rafael, CA 94903; (800) 521-6263 or (415) 492-3200. $49.95.

72 Spaceship Warlock

Mike Saenz, creator of the infamous Virtual Valerie, teamed up with 3-D-graphics expert Joe Sparks to launch Spaceship Warlock — an interactive science-fiction epic on CD-ROM. If you've got a color Mac II, 4 megabytes of RAM, and a fast CD-ROM drive, you can ride the Spaceliner Belshazzar as it attempts to evade the evil Kroll's pirate ship Warlock. Educorp Computer Services, 7434 Trade Street, San Diego, CA 92121; (800) 843-9497 or (619) 536-9999. $95.

73 Spectre

Spectre, the first Mac game from Velocity, presents a 3-D futuristic battle simulation that justifies the company's reputation for "virtual reality" warfare. Race your heavily armed, tanklike BattleCraft through a dizzying world of obstacles and attacking RobotCraft while trying to collect enemy flags. The multiplayer networking capability and digital sounds create an addictive shoot-'em-up experience. Velocity Development, Box 875, Palatine, IL 60078; (708) 991-0594. $59.95; three-user LAN pack, $99.95.

74 Tesserae

If you're looking for something to test your powers of concentration and strategy, try Tesserae, which challenges you to eliminate tiles according to color (or design, if you're playing on a monochrome Mac) by jumping tiles over one another. Sounds easy? It isn't, but it's definitely habit-forming. Work your way up from beginner to advanced levels, and then go for the tournament option. Inline Design, 5 W. Mountain Road, Sharon, CT 06069; (203) 364-0063. $49.95.
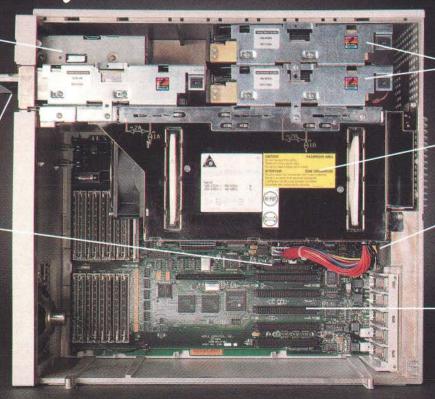
75 Vette!

Vette! lets you race through the streets and over the hills of San Francisco in a Corvette while pitting your driving skills against an opponent in a European sports car. You also have to dodge the hazards of city driving, such as pedestrians, trucks, and the police. Play with others over a modem or network. Spectrum HoloByte, 2061 Challenger Drive, Alameda, CA 94501; (510) 522-3584. $59.95.

ERGONOMICS

76 ELF Armor

Reports on the health risks of exposure to ELF (extremely low frequency) electromagnetic radiation emitted by computers have alarmed many Mac users. To reduce your exposure, try ELF Armor, which wraps around the cathode-ray tube to eliminate emissions at their source. If you have a compact Mac (a Plus, SE, or Classic), you can install ELF Armor yourself; otherwise have a dealer install it. Fairfield Engineering, 1500 S. Main, Fairfield, IA 52556; (515) 472-5551. $79.95 to $89.95.

77 NoRad Radiation Shield

NoRad manufactures video-display-radiation and -glare shields for most Mac monitors, including the one on the Classic. The screen attaches to the monitor with Velcro tabs, and a grounding cable is attached to either the monitor chassis or the CPU. These shields block out most electromagnetic radiation emitted by the monitor. NoRad Corp., 1549 11th Street, Santa Monica, CA 90401; (800) 262-3260 or (310) 395-0800. $129 to $249.

78 Graphics Visor

If staring at a computer screen all day makes your eyes sore, try LifeStar International's glare visor, which looks like an extended hood on your monitor. The Graphics Visor's black liner not only absorbs UV radiation and screen glare but it's also great for privacy! LifeStar International, Inc., 301 Vermont Street, San Francisco, CA 94103; (415) 626-6678. $49.50 to $79.50.

79 Kensington Antiglare Filters

Another option is Kensington's antiglare filters, which use optical glass and several layers of ceramic antireflective and scratch-resistant coatings to help reduce eyestrain. Screens are available in several sizes. Kensington Microware Ltd., 2855 Campus Drive, San Mateo, CA 94403; (800) 535-4242 or (415) 572-2700. $49.95 to $199.95.

80 LifeGuard 1.02

If you spend hours at your Mac, you may need someone (or something) to tell you to take a break every now and then. LifeGuard is a control panel that reminds you at selected intervals that you've been staring at the Mac too long. Unwind by doing an activity on LifeGuard's list — which includes stretching exercises — or create your own pull-down menu of noncomputer tasks. Visionary Software, Inc., P.O. Box 69447, Portland, OR 97201; (800) 877-1832 or (503) 246-6200. $59.95.

81 MacTilt

Ergotron's MacTilt is a monitor stand that enables you to raise your screen to a comfortable viewing level and lets you swivel it to any angle to help reduce the stress on your aching neck and back. The MacTilt attaches to your monitor and provides proper air flow beneath the monitor. Ergotron, Inc., 3450 Yankee Drive, Suite 100, Eagan, MN 55121; (800) 888-8458 or (612) 452-8135. $99.95.
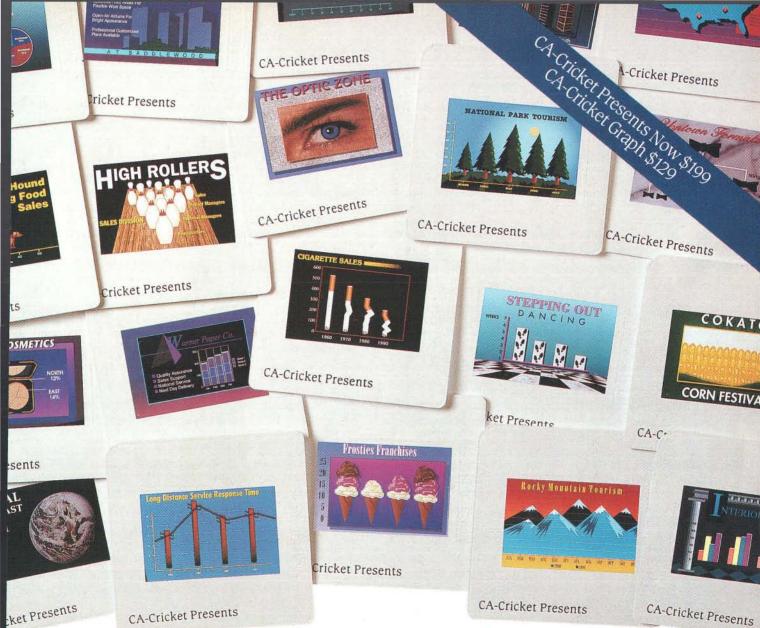
82 Wrist Reminder

The number of wrist rests available has multiplied as more people have become concerned about the debilitating effects of repetitive-stress injuries. To avoid these problems, you should type with your hands on the same level as your forearms. If this is difficult, try the Wrist Reminder, a wrist rest that attaches to your arm. It looks a little funny, but the palm rest and pointer keep your wrist in the correct position and discourage downward flexing. MicroComputer Accessories, Inc., 5405 Jandy Place, P.O. Box 66911, Los Angeles, CA 90066; (213) 301-9400. $19.95.

83 Wrist Pad Plus
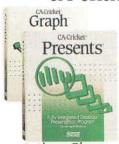
If you're looking for something that supports your wrist but doesn't attempt to take over your desk, try the Wrist Pad Plus, which is narrower and less bulky than many other wrist rests. Owl Scientific Plastics, Inc., P.O. Box 566,

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Cambridge, MA 02139; (617) 242-9748. $19.95 to $29.95, depending on finish.

84 Mouse Paw

You have a wrist rest for your keyboard, so why not one for your mouse too? The Mouse Paw attaches to your mouse and provides a small cushion for your hand. Marty's Computer Workshop, P.O. Box 550, Kendall Square, Cambridge, MA 02142; (617) 491-6935. $7.95.

RESOURCES

85 Desktop Publishing Success

Felix Kramer and Maggie Lovaas' book is intended for those in — or thinking of getting into — the DTP business. Topics range from starting your own business to assembling equipment to dealing with reluctant bill payers. Two appendixes — one on setting up a corporate DTP department and another on books, magazines, and other DTP resources — are particularly valuable. BusinessOne Irwin, 1818 Ridge Road, Homewood, IL 60430; (708) 206-2700. $27.50.

86 How to Develop, Publish, and Market Your Own Computer Software

If you think you have a million-dollar software idea but don't have the business background to promote it, you can get a lot out of this slim book by B. Thomas Taylor. The to-do lists at the end of each chapter contain useful advice and resources. T & C Publishers, P.O. Box 1, Dayton, MD 21036; (301) 596-9111. $19.95.

87 The Macintosh Companion

This new guide to the Mac comes with impeccable credentials: It was written by *Macintosh Bible* scribe Sharon Zardetto Aker and contains illustrations by Bloom County creator Berkeley Breathed. By combining the basics with more-advanced material, this is an excellent handbook for newcomers to the Mac. Addison-Wesley

Publishing Co., Inc., Route 128, Reading, MA 01867; (617) 944-3700. $22.95.

88 The Macintosh Memory Guide

If you want to buy more memory for your Mac but don't know how much you can install, grab a copy of this 26-page guide from Connectix. Its best feature is a system-by-system description of the memory needs and capacities of each currently available Mac model as well as those of the Plus, SE, and IIcx. Connectix Corp., 2655 Campus Drive, San Mateo, CA 94403; (800) 950-5880 or (415) 571-5100. Free.

89 Microsoft Press Computer Dictionary

Not entirely sure what *RAM* stands for? Unable to decipher the high-tech-speak in your hard-disk drive's manual? At such times, the *Microsoft Press Computer Dictionary* is a good reference book to have handy — it's fairly comprehensive, is simply written, and includes illustrations for those occasions when words are not enough. Microsoft Press, One Microsoft Way, Redmond, WA 98052; (800) 677-737 or (206) 882-8080. $19.95.

90 The Ultimate Unofficial Carmen Sandiego Companion

Carmen Sandiego has become so popular, we're surprised Kitty Kelley hasn't written a book about her. Instead, Corey Sandler and Tom Badgett have created a clever detective-agency handbook for use with the four Carmen games that we know and love. (If you've been out of touch, Brøderbund's best-selling Carmen Sandiego series teaches history and geography through a detective motif.) Bantam Electronic Publishing, 666 Fifth Avenue, New York, NY 10103; (800) 223-6834 or (212) 492-9479. $11.95.

91 ResEdit Reference

For those who want to learn the ins and outs of ResEdit

Finally, a printer that delivers what your computer promised.
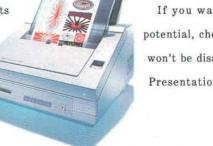
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The Colormate™ PS 80 thermal transfer printer puts the sun, moon and stars within reach. Outstanding PANTONE® approved colors can be yours as can sharp, clear output with 300 DPI graphics.

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The PS 80 integrates easily with any network, PC or Mac. Plus it works with most popular software. And of course, Adobe® PostScript® is standard.

If you want to realize your system's full potential, check out the Colormate PS 80. You won't be disappointed. Promise. For your Color Presentations Guide, call 1-800-NEC-INFO.

C&C Computers and Communications

CIRCLE **63** ON READER SERVICE CARD.

NEC

2.1, Apple has compiled the ultimate guide. This book starts with the basics (what's a resource?) and works its way up to more-complex issues (creating your own resources). Comes with a disk. Addison-Wesley Publishing Co., Inc., Route 128, Reading, MA 01867; (617) 944-3700. $29.95.

92 Verbum Interactive 1.0

This CD-ROM version of the computer-graphics magazine *Verbum* lets you see, hear, and participate in numerous animated and multimedia features and columns. Highlights include a roundtable discussion on multimedia involving such luminaries as Marc Canter, Jonathan Seybold, and Tom Corddry. This may be the way magazines will look in the future. Verbum, Inc., 670 Seventh Avenue, Second Floor, San Diego, CA 92101; (619) 233-9977. $49.95.

PUBLIC-DOMAIN SOFTWARE

These files are available from several sources, including user groups and on-line services such as America Online and Zmac. To help you find the files on Zmac, we've included information on the library and the filename.

93 Bat Filer

This powerful utility, from Fernando Salazar, can batch-process groups of files based on such criteria as file type and creator. Use Bat Filer to lock all files in a group or move all Word files on your hard disk into one folder. Accomplishes some of what Apple is still trying to do with Finder-level scripting. Zmac Download Library 1; filename BATFIL.SEA. Shareware, $30.

94 Colorize 3.0
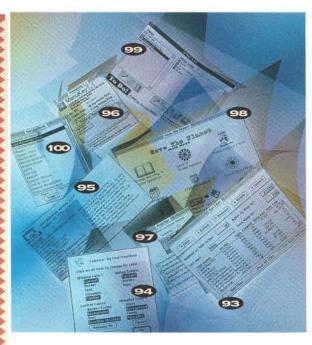
Colorize is a small application, from Neal Trautman, that lets you add color to various aspects of applications that may not have color (such as window backgrounds and menus). Zmac Download Library 1; filename COLORZ.SIT. Shareware, $5.

95 GIFConverter

This versatile graphics utility, by Kevin Mitchell, lets you view and convert files in GIF, EPS, TIFF, RIFF, RLE, PICT, startup screen, paint, or Thunderscan formats on any Mac. You can also print to any Mac printer. Zmac Download Library 1; filename GIFCON.SEA. Shareware, $40.

96 MenuKey

MenuKey, by Richard Harvey, is a control panel that displays a small template that contains all the Command-key shortcuts in an active program whenever you press the Command key. It was not tested with versions earlier than System 6.0.5. Zmac Download Library 3; filename MENKEY.SIT. Freeware.

97 PopChar

PopChar, by Gunther Blaschek, is a control-panel substitute for the Key Caps DA. It displays the character set for the active font and lets you paste selected characters into documents. Version 1.7 is compatible with TrueType. Zmac Download Library 3; filename POPCHA.SIT. Freeware.

98 Save the Planet 1991

This HyperCard 2.0 stack, from Roger and Kathy Cox, describes the problem of global warming and provides you with resources for understanding and solving pressing ecological issues. The shareware fee entitles you to two updates. Zmac Download Library 6; filename SAVPLT.SIT. Shareware, $16.

99 To Do!

The To Do! DA, by Andrew Welch, lets you keep track of daily activities. It's easy to use and very handy. Version 3.03 sports a new and improved interface. Zmac Download Library 2; filename TODO.SEA. Shareware, $15.

100 theTypeBook 2.2.

Desktop publishers with huge typeface libraries will appreciate Jim Lewis' theTypeBook, a utility that can print a type-specimen page for each font in your collection. System-7 compatible. Zmac Download Library 1; filename TYPEBK.SEA. Freeware.

Victoria von Biel and Bruce Mewhinney are *MacUser* associate editors, Michele Hasson is assistant editor, and Gregory Wasson is a contributing editor.

Desert-Island Diskettes

What five Mac products would *you* want if you and your Mac (and a generator) were stranded on a desert island? While you're pondering that question, here are the lists from some of *MacUser*'s most knowledgeable Mac addicts. Life on a desert island is hard enough, so we've eased our price restriction somewhat, but most of these Mac necessities are still priced at less than $250.

Steven Bobker
contributing editor and author
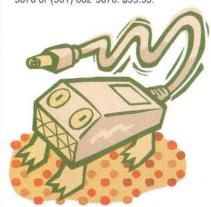
WriteNow. A word processor is the most important program I use. This one (now in version 2.2) may not be top-of-the-line, but it has a price you can't beat —and the grammar checker Grammatik Mac is thrown in for good measure. T/Maker Co.; (415) 962-0195. $199.

Klondike. This shareware solitaire program is the best Mac game ever and is nearly as vital as a word processor. Unison Software, Inc.; (408) 245-3000. Shareware fee, $10.

Silverlining. The last thing I need on a desert island is a problem with my hard-disk drive, and this program is my favorite for formatting and fixing. La Cie Ltd.; (800) 999-0143 or (503) 691-0771. $149.

Smartcom II. Just in case I get the cellular modem working, I want a good telecom program. Hayes Microcomputer Products; (404) 441-1617. $149.

1 Shot Worksheet. I can't imagine I'd be doing a lot of presentations or number crunching on this desert island, but just in case, this should do the trick. Baseline Publishing, Inc.; (800) 926-9676 or (901) 682-9676. $99.95.

Aileen Abernathy
senior editor

Publish It! Easy 2.1. I'd use my sojourn to become a *real* desktop publisher, and this small, speedy program has it all: word processing, graphics, page layout — even a slide-show feature and a built-in database manager. Timeworks, Inc.; (800) 323-7744 or (708) 559-1300. $249.95.

AgfaType 3.0. This CD-ROM contains the complete Adobe and Agfa type libraries (around 1,900 fonts) plus loads of shareware and other goodies. The package has 20 unlocked fonts, and other individual fonts can be unlocked with a cellular-phone call. Agfa Compugraphic; (800) 424-8973 or (508) 658-5600. $99.

TypeStyler 2.0. I'm not much of a designer, but version 2.0 of this type-manipulation program makes it easy to create snazzy logos and display type. Brøderbund Software; (800) 521-6263 or (415) 492-3200. $219.95.
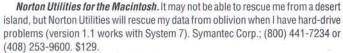
Aldus Gallery Effects. Because my artistic skills are minimal, this package's 16 customizable effects — such as charcoal, watercolor, and emboss—can let me transform ordinary images into something special. Aldus Corp.; (800) 333-2538 or (206) 628-2320. $199.

CheckList 2.0. When I send my publishing efforts to a service bureau far, far away, I'll need to include all the necessary fonts and graphics files. This essential utility can compile a list of the required files, gather them together, and compress them for transmission. ElseWare; (206) 547-9623. $179.

John Rizzo
technical editor

Norton Utilities for the Macintosh. It may not be able to rescue me from a desert island, but Norton Utilities will rescue my data from oblivion when I have hard-drive problems (version 1.1 works with System 7). Symantec Corp.; (800) 441-7234 or (408) 253-9600. $129.

System 7 Personal Upgrade Kit. With 32-bit addressing, a spiffy new Finder, and the ability to access almost anything from the Apple menu, System 7 gives me the biggest productivity boost for the buck, and it's actually more stable than version 6.0.7. Apple Computer, Inc.; (800) 776-2333 or (408) 996-1010. $99.

MacTrac. There's not much desk space on a desert island, so I would take this ergonomically designed trackball, which works great for southpaws too. Micro-Speed, Inc.; (800) 232-7888 or (510) 490-1403. $99; ADB version, $119.

RAM. I'd definitely stock up on memory before heading out — at press time, 4-megabyte SIMMs, available from several vendors, were hovering around $200 and 1-megabyte SIMMs had bottomed out at about $30.

Maxima 2.0. What am I going to do with all that extra memory? One solution is to use Maxima to create a RAM disk, which is many times faster than any hard-disk drive. Connectix Corp.; (800) 950-5880 or (415) 571-5100. $129.

Here's something most Macintosh users never thought they'd do.

for Macintosh.

Ready when you are. 1-2-3 for Macintosh works with either Apple's System 6, or System 7 and everything that comes with it. Like Publish and Subscribe, Apple Events, Virtual Memory, True Type™, and Data Access Manager. And it won't burst your Balloon Help™.

A no-risk proposition. Apple's John Sculley calls 1-2-3 for Macintosh "a spectacular product". Magazine reviewers have already hailed it as "a Mac application to its core" and "a design triumph". But skeptical as you probably are, we know mere words won't convince you. So buy a copy of Lotus 1-2-3 for Macintosh from your favorite dealer– then try it for 60 days with a money-back guarantee (Excel users can even upgrade at a special price). Or, **call 1-800-TRADEUP, ext. 6242** for a free demo video. Call Lotus? Now that's something you never thought you'd do either.

Lotus

Desert-Island Diskettes, continued

Russell Ito
senior editor

QuickLetter. Being stranded on a desert island is probably as good an opportunity as any to catch up with letter writing, so I'd take QuickLetter, which has a built-in address book that even automatically adds a salutation when you insert an address. Working Software, Inc.; (408) 423-5696. $49.

LabelWriter II. I enjoy writing letters, but addressing envelopes is another matter, so I'd want CoStar's latest LabelWriter — a big improvement over the original CoStar label printer. CoStar Corp.; (800) 426-7827 or (203) 661-9700. $249.

Redux. Redux is still my favorite backup utility — it's fast and simple to use, both for backups and restores. Microseeds Publishing, Inc.; (813) 882-8635. $99.

DiskTop. Even with System 7's wonderful capabilities, DiskTop is still invaluable for moving data around quickly, tweaking files, and generally keeping the Mac under control. CE Software, Inc.; (800) 523-7638 or (515) 224-1995. $99.95.

CanOpener. When you don't have the right application for opening a file or a document is messed up so badly that you can't open it, CanOpener does just what its name implies — and it can be a real lifesaver. Abbott Systems; (800) 552-9157 or (914) 747-3116. $125.

Bob LeVitus
contributing editor and author

Mutant Beach. The adventures of Native Nick — a laid-back tropical islander who discovers that the nose of Mohawk, the stone volcano idol, has been stolen — is definitely the coolest animated action-adventure/arcade game of the year. Inline Design; (203) 364-0063. $69.95.

Kid Pix. When I get sick of playing Mutant Beach, I'll turn to this fascinating little painting program, which is designed for kids but is so much fun that I find myself doodling with it almost every day. Brøderbund Software; (800) 521-6263 or (415) 492-3200. $49.95.

DiskDoubler. Because I won't be able to order a bigger hard drive on this desert island, I'll need DiskDoubler, which compresses files by an average of 50 percent. Salient Software; (510) 321-5375. $79.95.

DoubleUp. Software compression's all very well, but when I want real speed, I need hardware. This add-in card speeds Disk-Doubler's operation by four to eight times. Sigma Designs; (415) 770-0100. $295.

Thunder 7. For composing messages in a bottle, I'd need *the* most awesome interactive spelling checker/thesaurus/glossary in the world. Baseline Publishing; (800) 926-9676 or (901) 682-9676. $99.95.

Rik Myslewski
senior editor and labs director

DayMaker. Sudden freedom from deadlines could easily drive this workaholic mad, so I'd immediately create a multiproject schedule with Pastel's new personal-information manager. Pastel Development; (212) 431-3421. $99.95.

Inside Macintosh. My first project would be to catch up on some reading — starting with the six-volume, 4,000-page *Inside Macintosh* series. Addison-Wesley Publishing Co., Inc.; (617) 944-3700. $24.95 to $49.95 per volume.

THINK C 5.0. Next, I'd use my newfound free time to fulfill a lifelong dream: becoming a competent programmer. Symantec Corp.; (800) 441-7234 or (408) 253-9600. $299.

Voice Navigator II. Enforced solitude would soon have me talking to myself, so I'd splurge on Voice Navigator II, which would let me transform my mania into productive Mac management. Articulate Systems; (800) 443-7077 or (617) 935-5656. $899.97.

Talking Moose. And for some companionship on quiet, thoughtful nights, the new and improved Talking Moose and I could share a little wit and wisdom. Baseline Publishing; (800) 926-9676 or (901) 682-9676. $39.95.

Jon Zilber
editor

Serius Developer. When a genie offers you five measly wishes, the best strategy is to use the first wish to ask for more wishes. Likewise, my first desert-island pick is Serius Developer, which lets even nonprogrammers create a stream of sophisticated applications quickly and painlessly. Serius; (800) 876-6847 or (801) 272-7788. $495.

Envision. According to Guy Kawasaki (author of *The Macintosh Way* and *Selling the Dream*), a critical step in developing applications is designing the T-shirt that celebrates your new product. For that, I'll need Envision, a 3-D textile- and texture-design package to help me explore the material world. ModaCAD; (213) 312-6632. $1,995.

HackWrite. Using Serius Developer again, I'll develop this word processor to crank out a steamy unauthorized biography: *Selling the Book: The Kawasaki Way.*

Balloon Stack. System 7's Balloon Help has left some people wanting more, so Balloon Stack offers some industrial-strength balloon tutorials — on animal sculpture with balloons, that is. Fortunately for us desert-island dwellers, an ample supply of balloons is included. BugByte, Inc.; (800) 284-9220 or (302) 994-1502. $35.

E.M.M.A. The Electronic Mobile Macintosh Accessory takes everyone's favorite mail-order gizmo — The Clapper — and mounts it on an expansion card. Misplaced your PowerBook under a coconut? Clap on (clap, clap), beep back (beep, beep), clap on, beep back — you found it. Pricing and manufacturer not yet determined at press time.

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Chinon's Color/B&W Scanner Can Scan 3-Dimensional Objects. For Under $1,000!

We live in a colorful, 3-dimensional world. Now you can scan it all – all the colors, all the dimensions. Scan books or objects up to an inch high. Scan in color or black-and-white. No other scanner can do all this.

With OCR software you can input text without retyping it. With a simple add-in card, turn your computer into a full-featured fax. And DS-3000 will scan almost any type of graphic image, so it's perfect for desktop publishing. Whatever your application, we've bundled full-featured, brand-name software with our scanner so it's easy for you to get started.
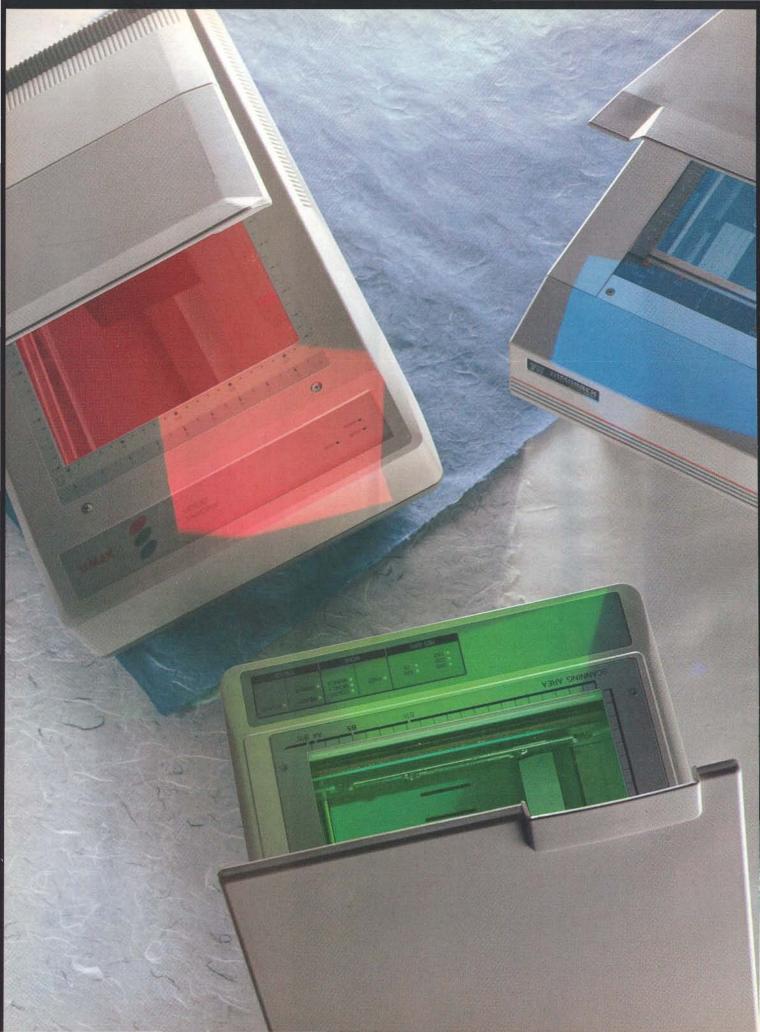
DS-3000 is available for IBM and compatibles or Macintosh computers. Call Toll-Free for the Chinon reseller nearest you – and start scanning the real world.

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SCANNING AREA

CAPTURING COLOR:

24-Bit Scanners
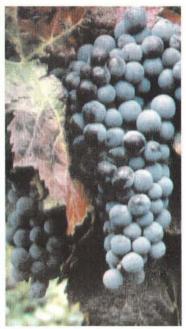
Fill your Mac full of vibrant colors, rich grays,
and fine line art — all for just a few dollars
more than mere black-and-white.

I f you want to introduce your Mac to every color in a Gauguin painting of Tahiti or all the grays in an Ansel Adams photo of Half Dome, a 24-bit-color scanner may be the tool you're looking for. A flatbed color scanner is a convenient, cost-effective way to bring virtually any image into your Mac. With the gap in prices between color and gray-scale scanners continuing to shrink, buying a 24-bit-color flatbed scanner makes a lot of sense — even if only a part of your work is in color.

Color images are essential for multimedia presentations and can liven up dreary reports and lackluster newsletters. Team up a color scanner with a color printer, and you've got a complete color-publishing or desktop-publishing composition system. With a little education and a lot more experience, you might even take the plunge into color-prepress work — but keep in mind that the color-prepress learning curve is formidable and that the best color flatbed scanner can't approach the quality you can get from traditional separations, high-end drum scanners, or desktop slide scanners (see Figure 1). If blacks, whites, and shades of gray dominate your palette, a 24-bit-color flatbed scanner won't let you down — it can handle gray-scale images beautifully. Many also offer high-resolution scanning that's especially useful for line art and OCR (optical character recognition).

BY BRUCE FRASER, PAUL YI,
AND THE MACUSER LABS STAFF

Figure 1: Color Quality

Hand scanner — Animas True Color Scanner

Flatbed scanner — Sharp JX-300

Slide scanner — Barneyscan CIS•4520

This month, MacUser Labs tests nine 24-bit-color flatbed scanners, all priced at less than $3,000 and some with street prices of less than $1,500. The AVR 3000/CL Plus ($1,890) claims to squeeze 1,600 dpi (dots per inch) into its scans, thanks to a software technique called *interpolation.* The Epson ES-300C ($1,699) and La Cie Silverscanner ($1,999) each use Epson's scanning engine but ship with their own software. The Howtek Personal Color Scanner ($1,295), the least-expensive letter-sized flatbed scanner we tested, also uses interpolation and reaches a resolution of 600 dpi. Microtek, manufacturer of last year's top pick — the '89 Eddy-award-winning Microtek MSF-300Z (see "An Inside Look at Scanners," September '90, page 132) — returns this year with the ScanMaker 600ZS ($2,195), an improved model that boasts 600-dpi resolution.

The Niscan Spectra Mac ($995) is a cross between a flatbed and a portable

hand scanner. It scans images as large as 4 x 6 inches at 400 dpi. (All the other scanners can handle at least letter-sized images.) The Sharp JX-300 Business Color Scanner ($2,915) returns from last year's report, this time with upgraded software; the Tamarack TTi 3000C Series ($1,950) is a 300-dpi newcomer; and the UMAX UC630 ($1,995) offers true 300-x-600-dpi resolution.
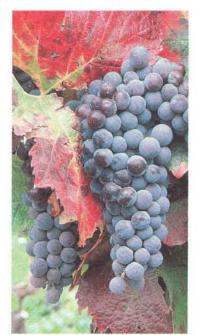
We put each scanner through a series of tests to evaluate its speed, ease of use, and image quality. The scanning software is every bit as important as the hardware — and, in one case, it even made the difference in our final recommendations.

Elementary Installation
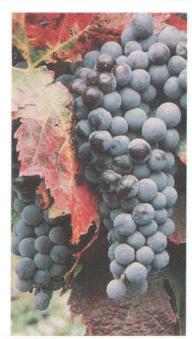
Getting your scanner running is as simple as removing a locking screw, which holds everything intact during shipping; cabling the scanner to your Mac; and installing the software. Unlike last year's models, all the scanners

that use a SCSI interface now have external or removable termination as well as two SCSI ports. With both of these features, your scanner need not be the last device in the SCSI chain.

Setting the SCSI ID, however, can still be a chore. With the AVR 3000/CL Plus, for example, you must set a series of DIP switches on the underside of the scanner. With the Epson ES-300C and the La Cie Silverscanner, you have to remove the SCSI-interface board to change the SCSI ID — be sure to ground yourself by touching a grounded metal object before handling the board. By contrast, the other SCSI scanners have easily accessible rotary or push-button controls for changing the SCSI ID.

The Niscan Spectra Mac, the Howtek Personal Color Scanner, and the Sharp JX-300 Business Color Scanner don't use the SCSI bus. You connect the Niscan Spectra Mac to the Mac's serial port with a modem cable, and you have to provide your own cable.

Figure 1: Desktop publishers who use color have a range of scanner options. A portable hand scanner is appropriate for FPOs ("for position only") and low-end multimedia only. A color flatbed scanner can provide scans for high-end multimedia and most color desktop publishing. Slide scanners offer the next step up in quality from the best color flatbeds. Traditional separations of a slide and a print of the slide show the ideal that color scanners aim for.

Traditional separation of print

Traditional separation of slide

Unfortunately, serial throughput is much slower than SCSI — in theory, about 58 kilobytes per second versus 1 megabyte per second — so performance is severely degraded. (As this report went to press, Niscan was working on various ways to increase throughput.) The Howtek Personal Color Scanner and the Sharp JX-300 Business Color Scanner each use Nu-Bus cards. NuBus speeds are comparable to SCSI speeds, but you can't use either scanner with non-NuBus Macs such as the Classic or the LC.

Installing scanner software isn't difficult, but choosing from the abundant software that's included with most scanners might be. Every scanner, except the Niscan, ships with at least an Adobe Photoshop *plug-in* — a software module that lets you scan from within the application — and many also come with their own scanning applications or DAs (see Table 1). Many of these scanners are also bundled with Adobe Photoshop,

Photoshop LE (a "light edition"), or Letraset's ColorStudio. We recommend using a plug-in: It's convenient to scan and edit with the same application. You can also analyze the quality of a scan quickly, using the application's tools, and make adjustments to the scanner's settings to get a better scan (see the "Five Steps to Better Scans" sidebar).

A Captive Audience

After positioning an image on the scanner's glass and adjusting brightness and contrast controls, you have to wait while the scan engine passes back and forth under the glass and captures the image. The Epson ES-300C, the La Cie Silverscanner, the Niscan Spectra Mac, and the Sharp JX-300 Business Color Scanner are *one-pass* scanners. All three color channels — red, green, and blue — are recorded in a single pass. The remaining five scanner engines use *three-pass* technology: A separate pass is made for

each of the three color channels.

Although how long it takes to make a scan isn't as important as how good the scan looks when it's done, our tests revealed significant speed differences. We timed how long each scanner took to scan both an 8-x-10-inch and a 4-x-5-inch image — from the time we clicked on the Scan button until we regained control of the Mac. The time we spent experimenting with settings, which depends largely on the software, wasn't included in our results.

The UMAX UC630, the Tamarack TTi 3000C Series, and the Microtek ScanMaker 600ZS were the fastest at scanning the 8-x-10-inch image (see Figure 2). Results were similar for the 4-x-5-inch image: The UMAX and Tamarack scanners finished within a few seconds of each other. The Howtek Personal Color Scanner proved to be very slow, but the Niscan Spectra Mac took last place — we waited nearly half an hour for the Spectra Mac to transfer the image to the Mac through

its sluggish serial port. The Howtek Personal Color Scanner and the Sharp JX-300 Business Color Scanner each have a fast mode that speeds up the scanning process at the expense of image quality.

The relatively sluggish performance of the one-pass scanners came as a surprise; we expected single-pass scanning to be inherently faster than three-pass scanning. Despite using the same engine, the La Cie Silverscanner was slightly faster than the Epson ES-300C, giving us evidence of the importance of software.

Carried over the Threshold

But you say your world just isn't that colorful? Color scanners are quite capable of capturing single-color line art or gray-scale images. Several of the scanners we tested support software interpolation, which averages an image's gray-scale or color values to enhance the resolution of the image and so helps smooth curves and improve detail.

We scanned a resolution test target at the scanners' true resolution as well as at the maximum resolution achievable through interpolation. The test target's patterns of converging lines, line pairs, and small text samples enabled us to evaluate each scanner's true resolution (engine) and software-enhanced resolution (interpolated) in both the vertical and the horizontal dimensions. Setting the scanner's *threshold* — the point at which it reads a dot as black or white — is critical, because lines can fill in or drop out if the setting is incorrect. Unfortunately, determining the right threshold setting is a tedious trial-and-error process. To make matters more difficult, converging lines and 6-point text samples require very different threshold settings. But thanks to the La Cie Silverscanner software's interactive preview mode, we could set the Silverscanner's threshold much more easily than we could any other scanner's. It let us zoom in quickly to check small details and see when they dropped out or became plugged up.

Although interpolation renders smoother diagonal lines and curves, it doesn't increase the scanner's true resolution. None of the scanners were able to accurately resolve our test targets beyond 600 dpi, and most had trouble at that level. In general, horizontal resolution is fixed by the number of CCD (charge-coupled device) elements in the scan head and doesn't vary. On the other hand, vertical resolution, which is controlled by the mechanical movement of the head, can vary considerably. The UMAX UC630 boasts the highest true vertical resolution, at 600 dpi. Although its scans are very crisp, they aren't quite as good as the La Cie Silverscanner's interpolated 1,200-dpi images. This emphasizes the role of software in a scanner's performance (see Figure 3). The Howtek Personal Color Scanner and the AVR 3000/CL Plus rendered noticeably lower resolution vertically than horizontally.

We also scanned a hairline grid (.25-point rules) to check the registration of the three passes — or, in the case of the one-pass scanners, the three colored lamps used in the single pass. Poor registration causes the rules to appear as three separate bands of red, green, and blue rather than a solid black or gray. Although slight color fringing was evident in all the scanners' output, the output from the Epson ES-300C and the La Cie Silverscanner was much worse than that of the others. The Sharp JX-300 Business Color Scanner and UMAX UC630 scanners had the
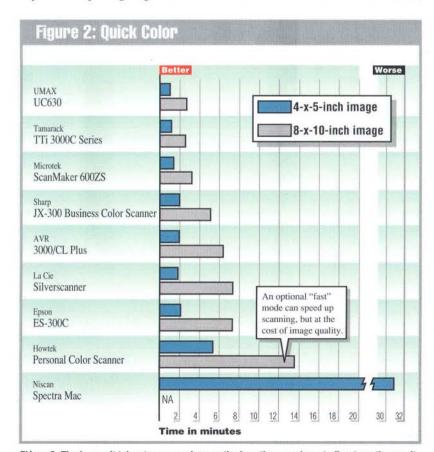
Figure 2: The longer it takes to scan an image, the less time you have to fine-tune the result. We timed how long it took each scanner set in Best mode to input a 4-x-5-inch and an 8-x-10-inch color photo. The UMAX UC630 and the Tamarack TTi 3000C Series were the fastest, and the Howtek Personal Color Scanner was the slowest full-sized flatbed scanner. The portable Niscan Spectra Mac — with its slow serial connection — came in dead last.

least color fringing, and the AVR 3000/CL Plus produced a very washed-out scan.

Finally, we scanned a penny to see how the scanners handled relief surfaces. We found that the better three-pass scanners were far superior in this task to the one-pass scanners with the Epson engine (see Figure 4). The angles at which the three light sources and filters are placed for one-pass scanning seem to create more odd colors than those captured by the better three-pass scanners.

Seeing Is Believing

Does the versatility of a 24-bit-color scanner exact a price in quality? To find out, we scanned two 4-x-5-inch color photos, each of which was a tough test of scanner performance. The photo of the group of children presented several scanning challenges, such as a wide range of skin tones and high contrast. The photo of a group of cross-country skiers taxed the scanners' ability to record strongly saturated colors against a large expanse of brilliant white snow as well as hard-to-capture shadow detail in the trees. To reduce variables introduced by software, we scanned these images by using each scanner's plug-in module for Photoshop or ColorStudio. Although expensive monitor-calibration hardware or special lighting can help you control the quality of your scans, we used neither in our testing, because they're typically found only in prepress shops equipped with high-end slide or drum scanners.

For the initial scan, we used each scanner's default settings. We used the software that worked with the manufacturer's supplied plug-in modules to improve the image's appearance on-screen. We scanned each color image at 150 and 300 dpi and printed the lower-resolution scans on a 300-dpi Tektronix Phaser IIPX, a PostScript thermal-wax color printer. (Because of dithering, the process of combining primary-colored dots to create a multitude of colors, color images print at one-half or one-third of the printer's

Figure 3: Resolution

AVR 3000/CL Plus   La Cie Silverscanner
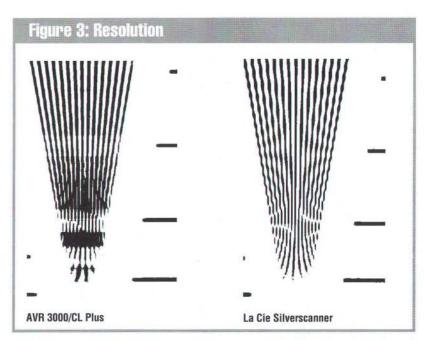
Figure 3: We used a scanner-resolution target — with converging lines, line pairs, and small text samples — to evaluate each scanner's true resolution (*engine*) and software-enhanced resolution (*interpolated*) in both the vertical and the horizontal dimensions. The La Cie Silverscanner captured the most detail in the converging lines; the AVR 3000/CL Plus plugs up much sooner than its claimed 1,600-dpi ability would indicate.

Five Steps to Better Scans

Simply putting the best hardware and software on your desktop won't guarantee that you always get a great scan. Although you can tweak a scanned image, remember that most adjustments can also introduce errors — you're better off starting with the best scan possible. Here are five steps that can help you do that:

1. Calibrate your monitor. When you're working with scanned images, you have to make critical color-editing decisions based on the tonal ranges and color balance you perceive on-screen. A calibrated monitor can help these values match the final print as closely as possible. Both software and hardware color calibrators are available. If your monitor is uncalibrated, set the contrast control to its center position and the brightness to about 80 percent.

2. Control your lighting environment. Color is passed to your eye through reflected light. The light under which you view the image you're about to scan is crucial when you're trying to match the image's colors to on-screen colors. Because colors vary with different lighting conditions, it's best to use incandescent or fluorescent lamps designed to simulate a daylight standard such as D50.

3. Use a plug-in software module for your image-enhancement application. Scanning from within your favorite image-manipulation application makes getting a good scan convenient. Correcting any scanner-induced deficiencies also becomes a simple matter of using the image-manipulation software's features. Image-enhancement applications such as Photoshop provide many valuable tools that can help you analyze what's wrong with a captured scan.

4. Start with the best possible image. Remember GIGO — garbage in, garbage out. A bad image won't produce a good scan. Study the image before scanning, and find the lightest and darkest areas — the white and black points. Concentrate on getting those right, and you'll probably get a good scan. If you need to crop the image, do it while you're scanning, because you can save time and disk space.

5. Practice, practice, practice. Your visual virtuosity will grow the more you use your 24-bit-color scanner.

resolution, with no quality loss.) The higher-resolution scans were sent to a service bureau, which output them onto Linotronic film and produced high-quality Fuji MatchPrints, prepress proof images. Finally, we performed a simple color-correction adjustment, using Adobe Photoshop to define each high-resolution scan's black and white points — its maximum bright and dark values — and used these modified scans to generate

another round of MatchPrints.

We asked a jury of prepress professionals to judge the quality of each image and compared the results with objective tests of a scanner's tonal range and color accuracy, using industry-standard Kodak SR-37 grayscale and Q60 color-reproduction guides.

The Sharp JX-300 Business Color Scanner, Tamarack TTi 3000C Series, and the UMAX UC630 produced

the best images — even with default settings. Additional adjustments improved the quality without any color shifts (see Figure 5). The Niscan Spectra Mac also yielded surprisingly good images, considering that it's more a portable scanner than a flatbed, and it maintained its color balance well when we changed the black and white points. We had to use a very high brightness setting, however, and as a result, the colors were less saturated than those

Figure 4: Penny Relief

AVR 3000/CL Plus

Epson ES-300C

Howtek Personal Color Scanner

La Cie Silverscanner

Microtek ScanMaker 600ZS

Niscan Spectra Mac

Sharp JX-300 Business Color Scanner

Tamarack TTi 3000C Series

UMAX UC630

Figure 4: Once you have a color scanner, you'll think of dozens of things to scan beyond flat photographs and artwork. A penny, for example, has low-relief contours that are a challenge for most scanners, especially the Epson ES-300C, the La Cie Silverscanner, and the Howtek Personal Color Scanner. The UMAX UC630 scan accurately captured all the details in the penny and was also at the top in the registration test.

in scans produced by the full-sized scanners. Although our objective SR-37 and Q60 tests showed that the Spectra Mac can't produce the quality necessary for high-end color prepress, it does a fine job for the less stringent quality requirements of multimedia images and FPOs ("for position only" images in desktop-publishing layouts).

Our jury found that all the other scanners' output manifested various flaws, so it rated those units below the Niscan Spectra Mac. The La Cie Silverscanner, Epson ES-300C, Howtek Personal Color Scanner, and Microtek ScanMaker 600ZS each had trouble with color balance. For example, when we expanded the tonal range of the Microtek scan—by adjusting the black and white points — the image shifted toward green in the highlights but not in the shadows and midtones. An overall color cast can be corrected relatively easily — all the scanners produced some degree of color casts — but a scan that tends toward one color in the highlights and another in the shadows is much more difficult to correct. The Howtek Personal Color Scanner, for example, rendered the snow as pale pink on one side of the

skier images and pale blue on the other.

The Epson ES-300C and La Cie Silverscanner produced the most-pronounced color shifts. With the ColorStudio plug-in, the Epson ES-300C scans were consistently biased toward red in the highlights to the extent that when we scanned the SR-37 gray target, white and lighter shades of gray appeared as shades of pink. Similarly, the snow surrounding the skier images displayed strong pink tinges.

Using the Photoshop plug-in solved the pink-highlight problem, but only at the expense of introducing so much *noise* (distorted data) in the shadows that the resulting scans were almost unusable. Because it's a one-pass scanner, the Epson ES-300C has a color-correction option built in to the hardware, but using this feature introduced so much noise that the scans were again unusable.

Although the Epson ES-300C and La Cie Silverscanner are each built around the Epson scanning engine, the scans they produced were so different that we swapped software to make sure we didn't have a hardware problem. La Cie's Silverscanner software

dramatically improved the Epson ES-300C's scan quality. Although the Silverscanner software wrings better performance out of the Epson scanner and is the best scanning software we tested, the La Cie Silverscanner is, unfortunately, handicapped by the Epson engine. Its color scans still aren't as good as those of the top three scanners. Further down the quality scale is the AVR 3000/CL Plus, which consistently produced scans that were washed-out, with very little contrast and saturation.

One Size Fits All

Color scanners are flooding into the market, and prices are dropping dramatically. All the affordable 24-bit-color flatbed scanners we tested proved adequate for multimedia use, FPOs, or scanning for on-screen images. These scanners' image quality ranged from merely acceptable to quite good. Software, along with the skill of the operator, can make an enormous difference in the performance of a scanner, but hardware remains the determining factor in color quality.

In general, the current state of scanning software is definitely lagging

On the Horizon

As color becomes a more and more essential part of Mac computing, the price of color scanners keeps sinking while quality, features, and availability increase.

For example, AVR unveiled an 800-dpi color flatbed scanner priced at $2,190. The AVR 8000/CLX has a 400-dpi engine and uses interpolation to bump the resolution to 800 dpi. Advanced Vision Research, Inc., 2201 Qume Drive, San Jose, CA 95131; (408) 434-1115.

Hewlett-Packard has entered the color-scanner market with the HP ScanJet IIc ($1,995), a 400-dpi, one-pass 24-bit scanner. In addition to a competitive price, the ScanJet IIc features printer- and color-calibration software. An automatic document feeder, a requirement for high-volume OCR work, is available for $695. Hewlett-Packard, 19310 Pruneridge Avenue, Cupertino, CA 95014; (201) 529-9500.

HSD Microcomputer has announced the Scan-X Color ($2,795), a 24-bit scanner with software that offers 600-dpi color and 2,400-dpi line-art resolution. HSD Microcomputer, 1350 Pear Avenue, Suite C, Mountain View, CA 94043; (415) 964-1400.

The XRS 6c OmniMedia Scanner ($3,500) is a 24-bit-color flatbed scanner that can digitize both prints and transparencies. The new scanner scans at a resolution of 600 dpi. XRS, 4030 Spencer Street, Torrance, CA 90503; (310) 214-1900.

Microtek has announced color-calibration software for its ScanMaker 600ZS scanner (included in this report). Microtek will bundle ScanMatch software from Savitar that should go a long way in helping capture accurate colors. Savitar software can work with any scanner, and there is a version available for desktop slide scanners as well — several scanner vendors, including many in this report, are investigating this software. Microtek Lab, Inc., 680 Knox Street, Torrance, CA 90502; (310) 321-2121. Savitar, Inc., 139 Townsend Street, Suite 203, San Francisco, CA 94107; (415) 243-3030.

The Mirror 600 Color Scanner missed our testing cutoff date, but it's identical to the UMAX UC630. Mirror also bundles the same software as UMAX. Although we weren't impressed by the software, the quality of the hardware is excellent. The Mirror scanner comes competitively priced at $1,397. Mirror Technologies, 2644 Patton Road, Roseville, MN 55113; (612) 633-4450.

The UMAX UC12000 ($5,995) uses a 10-bit engine and has a true resolution of 1,200 x 600 dpi; its interpolated resolution is 1,200 x 1,200 dpi. The UC12000 is a single-pass scanner, unlike the three-pass UMAX UC630 tested this month. UMAX Technologies, Inc., 2352 Walsh Avenue, Santa Clara, CA 95051; (800) 562-0311 or (408) 982-0771.

Figure 5: Scan Quality

Image A: high resolution

Traditional separation | Good: Sharp JX-300 Business Color Scanner | Poor: AVR 3000/CL Plus

Image B: high resolution

Traditional separation | Good: Tamarack TTi 3000C Series | Poor: Epson ES-300C

Key
✚ = good   ● = fair   ▬ = poor

	Overall	Low resolution		High resolution	
		Image A	Image B	Image A	Image B
Sharp JX-300 Business Color Scanner	good	good	good	good	good
Tamarack TTi 3000C Series	good	fair	good	good	good
UMAX UC630	good	good	good	good	fair
Niscan Spectra Mac	fair	fair	poor	fair	good
La Cie Silverscanner	fair	poor	fair	fair	fair
Epson ES-300C	fair	good	poor	poor	poor
Howtek Personal Color Scanner	fair	fair	poor	fair	poor
Microtek ScanMaker 600ZS	fair	poor	fair	poor	fair
AVR 3000/CL Plus	poor	poor	fair	poor	poor

Figure 5: We scanned two photos at 150 dpi and printed them on a 300-dpi PostScript thermal-wax color printer. We also scanned the photos at 300 dpi and output them to Linotronic film, which was then made into Fuji MatchPrints. The Sharp JX-300 Business Color Scanner captured the most accurate colors, with good tonal range. The Tamarack TTi 3000C Series and UMAX UC630 also exhibited excellent color accuracy.

behind the hardware. Most of these scanners include a major color image-editing application such as Photoshop or ColorStudio. These packages are excellent for tweaking scans once you've captured them, but the crucial software that you use to control the scanning process itself is — in most cases — still weak. We hope that the future will bring a similar evolution in scanning software, but in the meantime, check the "Bottom Line" sidebar for our current scanners of choice.

Bruce Fraser is a Bay Area author and frequent contributor to *MacUser*. Paul Yi is a *MacUser* associate editor.

Table 1 Criteria

Scanning method — The type of scanning engine, either one- or three-pass.
Scanner resolution — The resolution of the scanning engine without software interpolation.
SCSI termination — For scanners that use SCSI connection, whether termination is internal or external.
Bundled interface cable — The type of bundled Mac interface cable.
Scanning application — The name of any stand-alone scanning application that comes with the scanner.
DA — The name of any scanning DA that ships with the scanner.
Plug-ins — Third-party-program plug-ins that come with the scanner.
Max. resolution color scan — The maximum resolution for a 24-bit-color scan.
Max. resolution line-art scan — The maximum resolution for a 1-bit line-art scan.
Color preview — Does the scanning software offer a color view in the prescan preview?
Gray-scale preview — Does the scanning software offer a gray-scale view in the prescan preview?
Zoom preview — Does the scanning software offer a zoom view in the prescan preview?

The Bottom Line

Color scanners give your Mac access easily and conveniently to color, gray-scale, and black-and-white images as well as text for optical character recognition. Prices have dropped dramatically in the past year, so you can buy most of the scanners we tested for less than $1,500 each. Our testing puts four scanners at the top of the heap.

The **Sharp JX-300 Business Color Scanner** ($2,915 list, $1,800 street), **Tamarack TTi 3000C Series** ($1,950 list, $1,550 street), and the **UMAX UC630** ($1,995 list, $1,500 street) excel in speed and color accuracy. Each maintains the relationship between the red, green, and blue components of the scan throughout the spectrum, so post-processing tweaks, such as adjusting the black and white points or

changing the gamma curve, respond predictably and don't introduce color shifts.

The Sharp JX-300 interface requires a NuBus slot; the UMAX UC630 and Tamarack TTi 3000C Series are SCSI scanners that can occupy any position in your SCSI chain. Each has an easily accessible SCSI-ID switch. The Tamarack TTi 3000C Series has dual SCSI ports, and although the UMAX UC630 has one SCSI port, it comes with a pass-through SCSI cable.
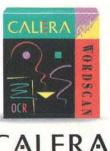
The UMAX UC630 is marred by software with a clumsy, nonintuitive interface. Some of the messages are only loosely translated into English — "Link is failure!" — and we don't normally expect a dialog box to appear when we click on a check box. But aside from its cosmetic deficiencies, the software works well. The UMAX UC630 also has the largest scanning area of these three units at 8.5 x 14 inches, and the engine has a higher vertical resolution than the other units', which is an advantage for OCR applications, especially when combined with the optional sheet feeder.

The Tamarack TTi 3000C Series is something of a dark horse — Tamarack is a Taiwanese company that has just starting distributing this product in the U.S., and as such, its after-sales support is an unknown quantity. But its hardware is impressive, and its software is functional, if somewhat rudimentary.

The final scanner to get our nod is the **La Cie Silverscanner** ($1,999 direct). The Silverscanner has the best software of all these scanners, providing an interactive color Preview mode with zoom that takes much of the drudgery out of discovering the right settings. We have serious reservations about the Epson one-pass scanning hardware: If you need accurate color, a calibrated monitor is a necessity with this scanner. If color accuracy isn't critical, the Silverscanner is a good general scanner, and the interpolated 1,200-dpi setting for line art produces very sharp black-and-white images. If you already have an Epson scanner, you should seriously consider buying La Cie's Silverscanner software. It costs $295, but if you do more than occasional scanning, it can pay for itself quickly by saving you time and reducing frustration.

Our four choices for the top affordable color scanners (counterclockwise from top): The Sharp JX-300 Business Color Scanner, Tamarack TTi 3000C Series, UMAX UC630, and La Cie Silverscanner.

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Table 1: Features of 24-Bit-Color Scanners

	AVR 3000/CL Plus ♦♦♦	Epson ES-300C ♦♦½	Howtek Personal Color Scanner ♦♦♦	La Cie Silverscanner ♦♦♦♦	Microtek ScanMaker 600ZS ♦♦♦½
List price	$1,890	$1,699	$1,295 direct	$1,999 direct	$2,195
Street price	$1,300	$1,400	NA	NA	$1,495
Pros	2-year warranty. Legal-sized scan area.	Low price. Color preview.	Low price. Legal-sized scan. Fast scan mode.	Friendly, powerful software.	Legal-sized scan area.
Cons	Colors are not saturated. Software is hard to use.	Software introduces color errors.	Slow scan mode is very slow.	Color quality suffers from Epson engine.	Mediocre scan quality.
Specifications					
Engine manufacturer	AVR	Epson	Howtek	Epson	Microtek
Scanning method	three-pass	one-pass	three-pass	one-pass	three-pass
Scanner resolution	300 dpi	300 dpi	300 dpi	300 dpi	300 dpi
Max. scan area (in.)	8.5 x 14	8.5 x 11.7	8.5 x 14	8.5 x 11.7	8.5 x 13.5
Mac interface	SCSI	SCSI	Centronics NuBus card	SCSI	SCSI
SCSI termination	external	internal	NA	internal	external
Bundled interface cable	SCSI	SCSI	Centronics	SCSI	SCSI
Software					
Scanning application	none	none	none	none	none
DA	Easy Scan	ScanDo	none	none	Microtek B & W, Color DA
Plug-ins	ColorStudio, Photoshop	ColorStudio, ImageStudio, Photoshop	Photoshop	ColorStudio, Digital Darkroom, ImageStudio, Photoshop, RagTime	Photoshop
Bundled applications	Photoshop LE	ColorStudio 1.5, ImageStudio 1.7	Photoshop LE	ColorStudio 1.5, Photoshop 2.0	Photoshop 2.0
Max. resolution color scan	1,600 dpi	300 dpi	600 dpi	1,200 dpi	600 dpi
Max. resolution line-art scan	1,600 dpi	600 dpi	600 dpi	1,200 dpi	600 dpi
Color preview	no	yes	yes	yes	yes
Gray-scale preview	yes	yes	yes	yes	yes
Zoom preview	no	yes	no	yes	no
Other					
Sheet feeder	yes, $795	no	no	no	yes, price to be set
Dimensions (L x W x H,in.)	21.3 x 12.9 x 4.5	20 x 12.5 x 5	20.5 x 14.5 x 5	12.6 x 20 x 5	20 x 13.5 x 5
Weight	15 lb	19.8 lb	28 lb	19.8 lb	19.5 lb
Warranty	2 years	1 year	1 year	1 year	1 year
Company	Advanced Vision Research, Inc. 2201 Qume Dr. San Jose, CA 95131 (408) 434-1115	Epson America, Inc. 20770 Madrona Ave. Torrance, CA 90509 (310) 782-0770	Howtek, Inc. 21 Park Ave. Hudson, NH 03051 (603) 882-5200	La Cie Ltd. 19552 S.W. 90th Ct. Tualatin, OR 97062 (503) 691-0771	Microtek Lab, Inc. 680 Knox St. Torrance, CA 90502 (310) 321-2121
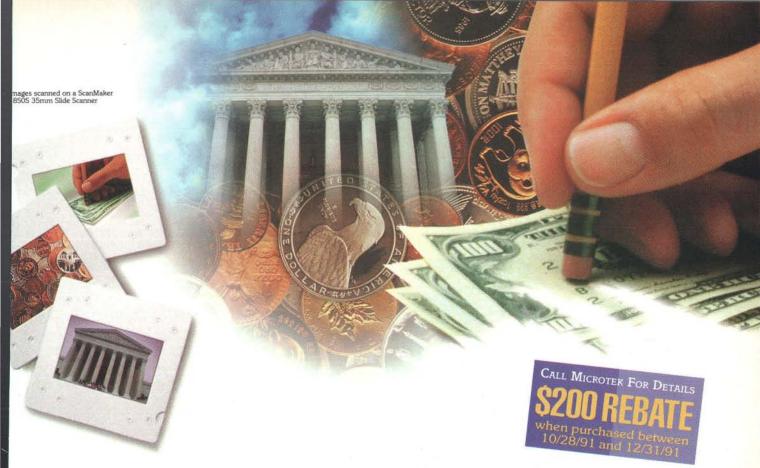
Table 1: Features of 24-Bit-Color Scanners, continued

	Niscan Spectra Mac ♦♦♦½	Sharp JX-300 Business Color Scanner ♦♦♦♦	Tamarack TTi 3000C Series ♦♦♦♦	UMAX UC630 ♦♦♦♦
List price	$995	$2,915*	$1,950	$1,995
Street price	$650	$1,800*	$1,550	$1,500
Pros	Compact. Portable. Good scan quality for a portable.	Good color-scan quality, with accurate colors.	Good color-scan quality. Fast.	Good color-scan quality. Fast. Good registration.
Cons	Extremely slow. Modem (serial) cable not bundled.	Expensive. Mac-interface NuBus card extra. Minimal warranty.	Software interface is confusing.	Software interface is confusing.
Specifications				
Engine manufacturer	Niscan	Sharp	Tamarack	UMAX
Scanning method	one-pass	one-pass	three-pass	three-pass
Scanner resolution	200 dpi	300 dpi	300 dpi	300 x 600 dpi
Max. scan area (in.)	4 x 6	8.5 x 11.66	8.5 x 11.75	8.5 x 14
Mac interface	serial	GPIB NuBus card, $570	SCSI	SCSI (one port)
SCSI termination	NA	NA	internal	internal
Bundled interface cable	third-party modem	GPIB, included with interface card	SCSI	SCSI
Software				
Scanning application	none	ChromaScan 2.0	none	none
DA	ScanDo	none	none	none
Plug-ins	none	Photoshop	Photoshop	Photoshop
Bundled applications	none	none	Photoshop 1.0.7	Photoshop 2.0
Max. resolution color scan	400 dpi	300 dpi	300 dpi	600 dpi
Max. resolution line-art scan	400 dpi	300 dpi	300 dpi	600 dpi
Color preview	yes	no	no	no
Gray-scale preview	yes	yes	yes	yes
Zoom preview	yes	no	no	no
Other				
Sheet feeder	no	no	no	yes, $550
Dimensions (L x W x H, in.)	12 x 6.5 x 3	16 x 13 x 5.5	18.5 x 13 x 5	21 x 13 x 4.5
Weight	7.5 lb	15.4 lb	18.4 lb	18 lb
Warranty	1 year	90 days	1 year	1 year/parts and labor
Company	Niscan, Inc. 1919 Old Denton Rd. Ste. 104 Carrollton, TX 75006 (214) 242-9696	Sharp Electronics Corp. Sharp Plaza Mahwah, NJ 07430 (800) 237-4277 (201) 529-8200	Tamarack Telecom, Inc. 2F, 20 Prosperity Rd. Science-Based Industrial Park Hsin-Chu, Taiwan, R.O.C. 886-35-780300	UMAX Technologies, Inc. 2352 Walsh Ave. Santa Clara, CA 95051 (800) 562-0311 (408) 982-0771

*Price includes cost of GPIB NuBus interface card.

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Woman Emptying Bucket of Water on Seated Companion. Man Balancing on One Foot. A ballet for eccentric acrobats? Yes, but at the time, also the world's most ambitious photographic research project. Refining the techniques he developed taking pictures of Leland Stanford's race horses in California, Eadweard Muybridge produced 100,000 negatives in the span of a year and a half. On a good day, he would take five or six hundred 4 x 5 pictures. — In your own quest for fresh insight, which type for the Macintosh® will be your most faithful servant? Perhaps it will be type from the foundry that spares nothing when it comes to capturing the original. Bitstream, where the spirit of type burns brightly. Where the kerning is exquisite. Where people go to outrageous lengths to preserve the integrity of a type designer's dream. Where our library of over 1,000 faces is growing all the time. Call to order or ask for a complete showing of PostScript® compatible fonts. Bitstream. Labor of love.

THIS PAGE IS SET IN BITSTREAM OZ HANDICRAFT, A **Bitstream** ORIGINAL TYPEFACE. TO ORDER CALL 1-800-237-3335.
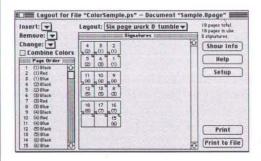
Aldus profit centers: Now you can use a single copy of PageMaker at work and at home — legally. The Aldus License Pack lets you make a copy of PageMaker, FreeHand, or Persuasion for 20 percent less than the retail price. Gee, what a savings. Aldus is also beefing up its fee-based technical support with CustomerFirst Online, a 24-hour forum on CompuServe that costs $249 per year.

By Aileen Abernathy

Group XPressions: At the fall Seybold show, Quark unveiled a workgroup editorial system aimed at newspapers and magazines. Tentatively called QuarkCopyDesk, this add-on to QuarkXPress 3.1 consists of a database server that stores and tracks page elements, a word-processing application (basically the text-editing portion of QuarkXPress) for writers and editors, and an XTension that provides an interactive link between the database and the master Quark-XPress document. Price: around $1,500. ETA: early 1992 (yeah, right).

Imposing forces: The latest production chore to reach the desktop is imposition — the stripping of document pages onto a single sheet, or signature, for printing, folding, and binding. Manual stripping is costly and time-consuming, but a new crop of electronic imposition products can create film-ready signatures on the Mac in minutes and offers substantial control over the output. ✘ Due in early 1992, PressWise (below) will create signatures from PostScript documents generated by PageMaker and QuarkXPress, with other formats to come. A flexible program with an elegant interface, PressWise will support the OPI and DCS standards and will be bundled with a variety of templates. Cost should be around $2,000, and it should be marketed through imagesetter vendors. ✘ For

QuarkXPress users only, DK&A ([619] 488-8118) offers INposition, a $1,750 XTension that saves signatures in QuarkXPress' native format. Because the signatures are QuarkXPress documents, you can edit elements without having to re-impose the pages. ✘ Impostrip, from Ultimate Technographics ([514] 733-1188), is a hardware-copy-protected program that can impose PostScript files from 37 Mac and PC page-layout and word-processing programs. The price ranges from $2,000 for a single filter (say, a QuarkXPress/Linotronic combination) to $20,000 for the complete set. Agfa Compugraphic now bundles Impostrip Primer (which handles PageMaker and QuarkXPress files only) with its Select-Set 7000 imagesetter.
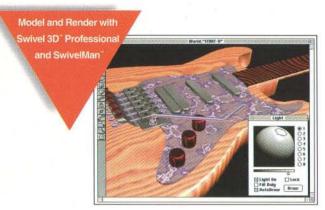
Clip artistry: Need high-quality photos as backgrounds or textures? Folio 1, from D'pix ([614] 451-4372), offers 100 colorful images of objects such as bricks (right), wood, fabric, and water, as well as more-abstract images. Four hundred bucks gets you medium-resolution (75 dpi) images on disk or CD-ROM (plus a T-shirt!); a transparency or 266-dpi version of each image costs $75. ▨

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Font Samplers

Creating a catalog for your typeface collection doesn't have to be a chore — these three utilities can print well-designed specimen sheets at a mouse click.

By Bruce Fraser

For anyone who designs with type, a type-specimen book is more a necessity than a luxury. A well-designed specimen book shows you the complete character set of each typeface in your collection and lets you judge each face's appearance and "color" at different point sizes and leading values. This sort of eyeball comparison can help you choose the right typeface for a particular job or let you compare TrueType faces with their PostScript Type 1 counterparts (for more on the competing typeface formats, see "Dueling Font Standards," October '91, page 165).

Creating a specimen book can be a tedious exercise, however, even if you make clever use of style sheets in a page-layout or word-processing application. And because most fonts you're likely to use must be downloaded to the printer, it takes a long time to print a complete set of specimen pages for even a modest type library. Fortunately, three programs are now available for the Mac that are designed to take the drudgery out of producing type-specimen pages: theTypeBook 2.2, from Jim Lewis of Golden State Graphics; SPECtacular 1.1.6, from Omega Systems; and TypeChart 1.5, from Octavo Productions. We used each program to print specimen sheets for a type library consisting of a mixture of Type 1 fonts (from Adobe and Bitstream), Type 3 fonts (shareware), and TrueType (vendor-supplied

faces as well as some produced by font-conversion utilities). In general, all three programs worked just fine, printing specimen sheets for all typefaces with only a couple of minor glitches.

theTypeBook

Of the three type samplers, theTypeBook, a freeware offering, is the least ambitious. Its four types of pages include only one specimen (Sample) page. The other options are KeyCap Table; Character Set; and Line Showings, which prints a two-line sample of each selected font and provides an easy and relatively fast way of printing a small sample of every font you have installed.

When you open theTypeBook, a dialog box displays a scrolling list of all the currently active fonts. You select the font(s) for which you want a Sample page generated and then click on Print. You can print the other three kinds of pages by selecting them from the File menu. The rest is automatic. The program generates each page as a separate print job, so if you're printing on a network, other users' print jobs can slip into the queue.

On the main specimen page (see Figure 1), you can change the sample text and display font measurements in inches, picas, millimeters, or ciceros. The Sample page has seven areas, including a space at top left for entering comments and the PostScript name of the font

How System 7 can give you more usable screen space

Screen space is always at a premium. Of course, you could buy a larger monitor. But that's not really the answer (you may already have a two-page monitor anyway). And then, it's just like a larger hard disk; pretty soon you want more—once again.

The real answer is to use the screen space you already have more efficiently.

System 7 can help.

Window Management Made Easy

Remember when the Mac could only handle one document at a time? Screen space didn't seem so scarce then. The key to Mac efficiency is in better management of the windows open on your desktop. Here are some quick tips:

Finder Shortcuts They help reduce Finder clutter. You'll see them described under the question mark menu. Among them:
- Holding down the Option Key while clicking the close box closes all Finder windows.
- Holding down the Option key while opening an icon closes its window while you move to a new level.
- Command-Up Arrow opens the window that encloses the active window.

Hide 'em! Use the "Hide Others" command located in the application menu to hide windows in applications you are not currently using. This will save space and increase speed.

System 7 Utilities
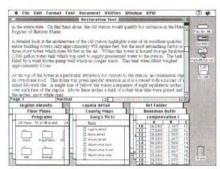
The release of System 7 has sparked the appearance of utilities designed specifically for its powerful capabilities. One of these is Kiwi™ POWER WINDOWS, a new window and document management tool.

It was designed to help you make maximum use of available screen space. Some existing applications already have "arrange windows" commands to divide your screen among documents, but invariably they are too crude or rigid to be truly useful. Worse, they are hostage to a single application.

Free Your Windows!

Using a proprietary technology called ARGO (Advanced Rectangular Graphic Organizer) Kiwi POWER WINDOWS takes screen optimization a giant step forward. It offers dozens of sophisticated preset "Window Layouts" (arrangement styles). You can also create custom window layouts. This built-in flexibility will suit any personal preference and situation.

These window arrangement capabilities are system-wide, allowing you to control windows in all your applications. You'll find it easy to learn and use, because you use the same interface in every program.

With KPW, efficient automatic window arrangement layouts such as this one are only a menu selection away.

Power Made Simple

It gets even better: with a single command, Kiwi POWER WINDOWS will allow you to arrange all windows in several applications at a time, facilitating cut-and-paste or comparison jobs between programs.

One of the drawbacks of using the Finder's new "Hide Others" command is that you can no longer jump to a window simply by clicking it: it's hidden. Kiwi POWER WINDOWS solves the problem: with it, you can activate any window from any application with a single menu selection.

Designed with a simple interface, but intelligent behavior, the program deals elegantly with complex situations such as multiple monitor setups, or changes in the number or size of the attached monitors.

Find Out More

Making the best use of your screen is only one of Kiwi POWER WINDOWS' advanced capabilities. With its Work Set feature, it manages documents as cleverly as it manages windows.

For more details, call the Kiwi Software information line at 1-800-321-5494. And if you mention that you saw this advertisement in MacUser, you just might get lucky: Every 50th caller will win a free copy of the program. One call per person, valid while quantities last.

Kiwi POWER WINDOWS is available from your software supplier, or directly from Kiwi Software. Suggested retail price $79⁹⁵

CIRCLE 77 ON READER SERVICE CARD.

A well-designed specimen book shows you the complete character set of each typeface in your collection.

at top right. Below these are one-line type samples, which progress from 6 to 18 points, and the uppercase and lowercase character set displayed at 48 points. Following this, three paragraphs display the sample text in user-definable size and leading combinations.

A measurement area at the page's bottom shows the average number of characters per pica for a given point size and the approximate point size necessary to generate a capital letter of a given height (in inches or millimeters). The page footer contains theTypeBook's logo and the developer's address and phone number. A customized version, which replaces the footer contents with your own information and/or logo, is available for $45. Our only reservation about theTypeBook is that the Sample page looks rather cluttered, partly because of the sheer amount of information packed into it. Developer Jim Lewis is tremendously helpful and frequently updates the program to incorporate users' suggestions.

SPECtacular

SPECtacular is a commercial program ($79.95) that resembles theTypeBook, particularly in the similarity of its main dialog box. It's a more robust offering, however, with 11 different specimen sheets. The pages are handsomely designed — indeed, the design threatens to overwhelm the text — and some are two-page rather than single-page layouts (see Figure 2). A Select All button in the main dialog box lets you select all your installed fonts, and individual fonts can be selected from the list. When you click on the Print button, a second dialog box appears; it contains pop-up menus that let you choose the sample text you want to use (you can import text from a file) and the layout you want to print. For two-page layouts, you have the option of printing either or both pages.

One unfortunate quirk of SPECtacular, not mentioned in the manual, is the manner in which it has you fill in registration

Hiroshige-Book

Figure 1: theTypeBook, a freeware program, offers a fast, no-frills approach to producing type-specimen sheets. It provides only one sample page, which looks slightly cluttered because of the amount of information packed into it.

information, which then appears on each page. The program didn't ask for this information when we first opened it; instead, the registration dialog box appeared *after* we had already chosen fonts and layouts and attempted to print them. Once we had filled in the registration information, the program returned us to the main selection screen, where we discovered that all our font and layout choices had been canceled and we had to select them all over again.

Many of SPECtacular's layouts resemble those offered by theTypeBook — including sample paragraphs, keyboard layouts, and characters per pica — but SPECtacular also offers additional information. The Reference List layout cross-references each true font name to its location on the Font menu, telling you, for example, that Helvetica Light with the bold style attribute applied will give you Helvetica Black. The Two-Column Font List layout prints the true name of each font in its own typeface. We found that we had to select the Unlimited Downloadable Fonts in a Document option under Page Setup to get this layout to print, a fact that isn't mentioned in the documentation. (This option lets you print more fonts on a page without running out of printer memory, but printing times are quite a bit

slower.) The manual merely states that "if your printer is low on memory, you may get out of memory printing errors," without offering any suggestions on how to deal with the situation. Indeed, the incomplete manual is the weakest link in this otherwise fine program.

Version 1.2 of SPECtacular, which should be out by now, will offer two new layouts, improved kerning, more user preferences, and increased support for QuickDraw printers.

TypeChart

TypeChart ($99.95) offers five extremely well-designed pages that contain all the information offered by the other packages, with the slightly puzzling omission of an average-characters-per-pica chart. Unlike the other two programs, TypeChart lets you view the specimen pages on-screen before you print them. And although all three programs generate pages with a left margin suitable for three-hole punches, only TypeChart comes with an aluminum binder containing four dividers with tabs marked for font lists, serif fonts, sans serif fonts, and the user guide.

All of TypeChart's specimen pages have a tasteful, understated design that focuses attention on the type rather than on the layout. The Overview page shows

one headline size; the standard and composite characters; three text paragraphs; and samples of the italic, bold, bold-italic, underline, outline, shadow, condensed, and extended styles (see Figure 3). The Headline page shows the font in a selection of sizes from 16 to 127 points, and the Text page shows sample paragraphs in text sizes from 5 to 14 points. (You can use the built-in Text Editor to change the sample text or import text from a file.) The Shift/Option page shows all the alternate characters along with the keystrokes needed to reach them, and the Styles page shows the standard character set in each of the styles shown at the bottom of the Overview page.

When you open TypeChart's Template file, you can choose a font for each of the five pages and print any or all pages. Alternatively, you can choose Multiple Print, which brings up a dialog box that lets you choose multiple fonts and the types of pages you want to print. TypeChart is the only program that lets you save specimen pages as separate files, and you can have multiple TypeChart files open simultaneously. The program can automatically tile the windows so that you can compare different fonts on-screen. If you hold down the Option key while scrolling or changing the page in the active window, all the other TypeChart windows scroll or change pages too, which further facilitates comparisons.

TypeChart's Options menu offers more handy features. The Type Test dialog box lets you type or paste in your own sample text; set the font, size, leading, alignment, case, and style; and print the result. The Font Info window shows the type (FONT or NFNT), FOND ID number, and installed sizes for each selected font, plus the total number of fonts currently installed. Buttons let you search for ID conflicts, print a Font List that contains all the displayed information, and print a Specimen List that shows all installed fonts in their respective typefaces. If you print a Specimen List, you are prompted to turn on the Unlimited Downloadable Fonts in a Document option. TypeChart also features comprehensive on-line help. We couldn't print Adobe's Hiroshige font — we kept getting a PostScript error message — but other than that, TypeChart behaved well.

The Bottom Line

All three programs are System 7-compatible but not System 7-friendly — they don't support System 7-specific features

Figure 2: SPECtacular provides the most flexibility in creating a type-specimen book, supplying 11 different specimen sheets, some of which are two-page layouts. Shown here is the Big A layout, which presents a typeface's style variations on the first page and a key-cap chart on the second.

such as Balloon Help, publish-and-subscribe, or Apple events — and none displayed any problems running under 32-bit addressing. The programs are compatible with Adobe Type Manager, Adobe Type Reunion, and Suitcase II.

For a no-frills approach to producing type-specimen sheets, theTypeBook has a price that's hard to beat — it's free and is available from on-line services such as Zmac. If you prefer a more full-featured approach, both the commercial offerings are a good value. SPECtacular offers more layout flexibility at a slightly lower price, whereas TypeChart includes a heavy-duty binder, on-line help, the ability to quickly compare fonts on-screen, and diagnostic tools for identifying font conflicts. In choosing among these products, you should let the price and the appearance of the sample pages be your guide.

Bruce Fraser is the author of Adobe Illustrator 3.0 Complete and Using FreeHand 3.0.

Get Info

SPECtacular
♦♦♦♦
Published by: Omega Systems, P.O. Box 7633, Chico, CA 95927; (916) 894-6351.
Version: 1.1.6.
List Price: $79.95.

theTypeBook
♦♦♦½
Published by: Jim Lewis, Golden State Graphics, 2137 Candis Avenue, Santa Ana, CA 92706; (714) 542-5518.
Version: 2.2.
List Price: Free if you order from an on-line service or send an 800K disk and postage-paid disk mailer to Golden State Graphics; customized version, $45.

TypeChart
♦♦♦♦½
Published by: Octavo Productions, 3623 Sunnycrest Drive, Suite 800, N. Vancouver, British Columbia V7R 3C5, Canada; (604) 987-5270.
Version: 1.5.
List Price: $99.95.

Figure 3: TypeChart's five specimen pages have an understated design that focuses attention on the type. The Overview page (left) provides a quick look at a typeface's overall characteristics, and the Text page (below) shows how a font will fare as a text face.

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System 7 Compatibility: ❼ indicates that the product will run under System 7.

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FON0086	LetraStudio	275.

Postcraft
DTP0063	Layouts	75.

Quark, Inc.
DTP0049	XPress 3.1	519.

TimeWorks
DTP0048	Publish It! Easy with File IT! 2.1	139.

DISK DRIVES & BOARDS

Applied Engineering
⦿DRI0287	AE HD Mac Drive	245.
⦿INP0148	QuadraLink	205.

Computer Care
⦿DRI0337	MacRescue Video	349.
⦿DRI0338	Video MacPac	349.

Computer Friends
⦿GRA0251	ColorSnap 32 Plus	649.

Dayna Communications, Inc.
DRI0174	DaynaFile dual 360K (5.25) & 1.44 (3.5)	739.

Kennect Technology
DRI0218	Drive 1200	259.
DRI0141	Drive 2.4	325.
DRI0219	Drive 360 (5.25 in. floppy disk drive)	259.
⦿DRI0140	Rapport	195.

Lapis
DRI0391	DisplayServer LC	329.
DRI0392	DisplayServer PDS/30 (DE/30,IIsi)	359.
DRI0393	DisplayServer II-DPD	399.
DRI0394	DisplayServer SE DPD	359.

Mass MicroSystems
DRI0253	DataPak	699.
DRI0254	DataPak IIC	749.
DRI0354	DataPak 88 Classic	1099.
DRI0323	DataPak Duet	1389.
DRI0256	DataPak MO 512 MB Read-write/optical	3425.
GRA0243	QuickImage 24 Video Frame Grabber	579.

Micron Technology
⦿DRI0187	Xceed 8-bit Video Card NB6-48	349.
⦿DRI0236	Xceed IIci - 128 Cache Card	239.

MicroTech International, Inc.
DRI0294	Athena A100 100 Meg Drive	899.
DRI0293	Athena A50 50 Meg Drive	599.
DRI0311	Europa 100 Meg Drive	699.
DRI0308	Europa 20 Meg Drive	349.
DRI0309	Europa 40 Meg Drive	399.
DRI0307	MicroTech R50 50 Meg Removable	999.
DRI0376	Nova N50 Meg Drive	565.

Optical Access International
⦿DRI0251	Access CD	649.
⦿DRI0252	Access MF	2995.
⦿MED0036	Access MF Rewritable Optical Cartridge	250.

Peripheral Land, Inc.
⦿DRI0375	Infinity 88 Removeable Single	1199.
⦿DRI0193	Infinity Dual 40Mb Removable	1199.
⦿DRI0115	Infinity Turbo 40 Meg Removable	699.
⦿DRI0154	Turbo Floppy 1.4 Drive	309.
⦿DRI0406	QuickSCSI	479.

PowerUser™
⦿DRI0201	20 Meg External Hard Drive	329.
⦿DRI0206	44 Meg Removable	589.
⦿DRI0203	40 Meg External Hard Drive	349.
⦿DRI0204	60 Meg External Hard Drive	419.
⦿DRI0205	80 Meg External Hard Drive	459.
⦿DRI0326	105 Meg External Hard Drive	499.

EDUCATIONAL & INSTRUCTIONAL

Beacon Technology, Inc.
⦿HYP0034	HyperBible International Version 2.0	125.
⦿HYP0035	HyperBible King James Version 2.0	125.

Broderbund
GRA0268	Kid Pix	35.

Design Your own Home: Architecture, Interiors or Landscape (Abracadata)
Interiors provides professional tools for creating a home with character and beauty. Provides dozen of ideas, showcases hundreds of furniture shapes and arranges furnishings in eight different views. **CAD0033 $65.**

Landscapes module completes the job you started with your plans and interiors. Arranges plants, walks, steps and other elements the way you want them. Even ages trees and shrubs. **CAD0034 $65.**

Use **Architecture** to design your next home. It's library of sample plans offers many styles and its icon library provides standard symbols. Calculates distances, diagonals, areas and angles. **CAD0032 $65.**

EDU0170	The Playroom	29.

Davidson & Associates
EDU0118	Math Blaster Mystery	29.

HyperGlot
⦿EDU0179	French Tense Tutor	39.
⦿EDU0183	French Word Torture	35.
⦿EDU0189	Learn To Speak French	65.

Individual Software
⦿EDU0193	Training for Microsoft Word	42.
⦿EDU0203	Training for PageMaker 4.0	39.
⦿EDU0057	Typing Instructor Encore	19.

Learning Company
EDU0084	Math Rabbit	35.
⦿EDU0048	Reader Rabbit 2.2	35.
EDU0287	The Writing Center	59.
EDU0275	SuperSolvers Out Numbered	35.

Accountant Inc.
(Softsync/BLOC) ⦿ "Accountant Inc. is the most complete intergrated accounting and financial management package for the Mac" says MacUser Magazine 3/91. Starting up with Accountant Inc. is quick and easy. Combines exceptional power with an elegant user interface to provide more flexibility and better reporting with less work. Unlike other packages, Accountant Inc. will grow as your business grows. Package includes Invoicing, Inventory, Receivables, Payables, Check Writing, Job Cost, Payroll, Integrated General Ledger and Financial Reporting. **FIN0048 $339.**

MECC Marketing
⦿ENT0381	The Oregon Trail	29.
⦿EDU0190	Number Munchers	29.
⦿EDU0191	Word Munchers	29.

Microlytics
EDU0242	Elements of Style	35.
DAC0031	Inside Information	68.
EDU0217	Random House Encyclopedia	68.

MicroMaps
GRA0228	MapArt EPS Format	95.
GRA0229	MapArt PICT Format	95.

Nordic Software
EDU0142	MacKids Preschool Pack	35.
EDU0143	MacKids World Quest	30.
EDU0051	MacKids Turbo Math Facts	25.
⦿EDU0276	Word Search Deluxe	35.

Penton Overseas (Full line available)
	⦿VocabuLearn Level I or II: French,German, Hebrew, Italian, Japanese, Russian or Spanish	ea. 35.

Personal Training Systems
	⦿Macintosh, HyperCard, FileMaker Pro, Microsoft Excel, Microsoft Word, Aldus PageMaker 4.0, Aldus FreeHand, Aldus Persuasion, Quark XPress 3.0	ea. 52.
EDU0277	Converting to System 7-part 1	52.
EDU0278	Converting to System 7-part 2	52.

Queue
EDU0109	Computer SAT Prep	57.

Visionary Software
BUS0190	First Things First	49.
EDU0207	LifeGuard	45.
EDU0209	Synchronicity 3.0	45.

Voice & Video
	Getting Started Video: Excel 2.2, PageMaker 4.0, Word 4.0	ea. 55.
	Advanced Techniques Video: Excel 2.2, PageMaker 4.0, Word 4.0	ea. 55.
EDU0063	HyperCard Getting Started Video	55.

Zondervan Publishing House
⦿BOK0022	MacBible-Greek	119.
BOK0031	MacBible-Hebrew	119.
⦿BOK0021	MacBible - King James Version	79.
BOK0032	MacBible-NAB	79.
BOK0033	MacBible NRSw/Apocrypha	79.
BOK0034	MacBible-NIV Study Bible Notes	79.
⦿BOK0020	MacBible - New International Version	79.

ENTERTAINMENT
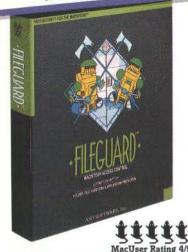
Artworx
⦿ENT0303	Bridge 6.0	29.
ENT0262	GrailQuest	19.

Baseline
ENT0351	Talking Moose	23.

Broderbund
ENT0259	Shufflepuck Cafe	25.
	Where is Carmen Sandiego?	ea. 29.
ENT0284	SIMCity	29.
ENT0356	SimEarth	40.

Bulls City Software
ENT0308	Moriarity's Revenge	35.

Bullseye
⦿ENT0046	Fokker Triplane Flight Simulator 2.8	27.
⦿ENT0261	P51 Mustang 2.8	37.
⦿ENT0388	SPLAT'ERS	37.

Centron Software, Inc.
⦿ENT0264	BlackJack Ace	27.
⦿ENT0329	BlackJack Strategy Tester w/ BlackJack Ace 65	
⦿ENT0384	Canis	27.
⦿ENT0277	Casino Master	40.
⦿ENT0289	Casino Master Deluxe Mac II Version	45.
⦿ENT0257	CrapsMaster	27.
⦿ENT0383	Puzzle Master	29.

MacDraft 2.1
(Innovative Data) ⦿ Provides the tools you need to create accurate drawings on your Mac. It supports PostScript output, has a removeable geometric drawing tool palette, multiple layers (limited only by available memory), on-line symbol libraries, 44 different scales, custom line styles, dimension lines, Bezier and spline curves, automatic area calculation, and smoothing of freehand shapes. MacDraft supports 32-bit QuickDraw and custom fill patterns in both black and white and color. Reads TIFF and MacDraw II files. **CAD0039 $279.**

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MacUser Rating 4/91
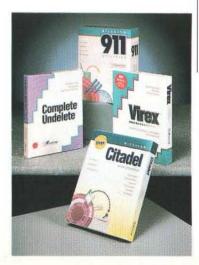
FileGuard 2.7
(ASD) ❼ "It's Sleek, Fast, and safe. I highly recommend it": MacUser April 1991. Protect your Hard Drives and Partitions from unauthorized access (including security bypass with a system diskette), copying and erasure; Applications and File/Folders (including system folder) from unauthorized access, deletion, and /or illegal copying; Desktop (including system folder) from alterations by unauthorized user; Keep an eye on System Usage with the system users log which continuously tracks user/group activity. System 7 compatible.
Single: UTI0135 $139.
Office 5 Pack: UTI0130 $499.
Office 10 Pack: UTI0131 $799.

Electronic Arts
ENT0321	Earl Weaver Baseball	32.
❼ENT0355	Harpoon	39.
ENT0382	PGA Tour	39.

Sir Tech Software, Inc.
ENT0346	Bane of the Cosmic Forge	35.
ENT0347	Wizardry II: Knight of Diamonds	29.

Spectrum HoloByte
ENT0344	FACES, TETRIS, Welltris	ea. 25.

The Software Toolworks
ENT0281	Chessmaster 2100	32.
ENT0269	The Hunt For Red October	20.

Three-Sixty
ENT0323	Sands of Fire	32.

XOR Corporation
ENT0274	MacGolf Classic	52.

FONTS & APPPLICATIONS
Adobe Systems, Inc.
❼DAC0028	Adobe TypeAlign	65.
❼FON0264	Adobe Type Manager 2.0	59.
❼FON0351	Adobe Type On Call	47.
❼FON0286	Adobe Type Set 1 or 2	ea. 65.
❼FON0326	Adobe Type Set 3	129.
❼FON0434	Adobe Type Set: Letters,Memos,Faxes	99.

❼FON0435	Adobe Type Set: Invitations & Awards	99.
❼FON0436	Adobe Type Set: Overheads & Slides	99.
❼FON0437	Adobe Type Set: Spreedsheets & Graphs	99.
❼FON0295	Adobe Type Reunion	45.
❼	Smart Art I, II, III or IV	ea. 65.

Altsys
❼UTI0224	EPS Exchange	89.
❼FON0014	Fontographer 3.3	269.
❼FON0284	Metamorphosis Professional 2.0	89.

ARES
❼FON0361	FontMonger	62.

Broderbund
GRA0295	TypeStyler 2.0 w/ATM	Call.

Pacific Data Products
INP0153	Pacific MacPage	529.

Postcraft
DTP0062	Effects Specialist	115.

QMS
UTI0169	UltraScript	135.

TeleTypesetting
❼FON0343	T-Script 3.0	92.
❼FON0357	T-Script Basic	55.

GRAPHICS & MULTIMEDIA
3G Graphics
❼GRA0188	Images with Impact! Accents & Borders	165.
❼GRA0111	Images with Impact! Business 1	65.
❼GRA0257	Images with Impact! People 1	95.

Abracadata
CAD0032	Design Your Own Home-Architecture	65.
CAD0033	Design Your Own Home-Interiors	65.

Adobe Systems, Inc.
❼DTP0054	Illustrator 3.0 (w/ ATM 2.0)	379.
❼GRA0125	Streamline 2.0	122.
❼GRA0191	PhotoShop 2.0	549.
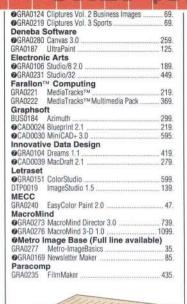
ScanMaker 600ZS & ScanMaker 1850S (Microtek)
ScanMaker 600ZS, is the newest addition to Microtek's award-winning series of color/gray-scale scanners. Capable of scanning 24 bit color, 256 shades of gray and black and white, captures images with up to 600 dots-per-inch resolutions. **INP0180 $1599.**

❼GRA0092	Digital Darkroom 2.0	259.
❼GRA0264	Freehand 3.0	399.
GRA0131	Super 3D 2.5	329.
❼HYP0027	SuperCard 1.5	199.
❼GRA0112	SuperPaint 3.0	135.

Baseline Publishing
GRA0242	Color MacCHEESE	56.
GRA0239	Master Color	49.
GRA0238	Master Paint	49.

Bright Star Tech, Inc.
❼GRA0161	interFACE	249.

CE Software
GRA0070	CalendarMaker 3.0	31.

Claris
❼CAD0029	ClarisCAD 2.0	645.
❼GRA0271	MacDraw Pro	285.
❼GRA0117	MacPaint 2.0	89.

Dream Maker
❼GRA0105	Cliptures Vol. 1 Business Images	69.

❼GRA0124	Cliptures Vol. 2 Business Images	69.
❼GRA0219	Cliptures Vol. 3 Sports	69.

Deneba Software
❼GRA0280	Canvas 3.0	259.
GRA0187	UltraPaint	125.

Electronic Arts
❼GRA0106	Studio/8 2.0	189.
❼GRA0231	Studio/32	449.

Farallon™ Computing
GRA0221	MediaTracks™	219.
GRA0222	MediaTracks™ Multimedia Pack	369.

Graphsoft
BUS0184	Azimuth	299.
❼CAD0024	Blueprint 2.1	219.
❼CAD0030	MiniCAD+ 3.0	595.

Innovative Data Design
❼GRA0104	Dreams 1.1	419.
❼CAD0039	MacDraft 2.1	279.

Letraset
❼GRA0151	ColorStudio	599.
DTP0019	ImageStudio 1.5	139.

MECC
GRA0240	EasyColor Paint 2.0	47.

MacroMind
❼GRA0273	MacroMind Director 3.0	739.
❼GRA0276	MacroMind 3-D 1.0	1099.

❼Metro Image Base (Full line available)
GRA0277	Metro-ImageBasics	35.
❼GRA0169	Newsletter Maker	85.

Paracomp
GRA0235	FilmMaker	435.

ScanMaker 1850S is a revolutionary new 35 mm slide scanner that's perfect for desktop publishing, presentation graphics and multimedia applications. Allows you to scan 24 bit color and 256 shades of gray at up to 1850 dots-per-inch resolution. Full version of Photoshop 2.0 included with both 600ZS and 1850S. **INP0176 $2369.**

❼GRA0286	Magic	259.
❼CAD0041	ModelShop II	579.
❼GRA0233	Swivel 3D Professional	435.
❼GRA0234	SwivelArt	81.

Pixar
❼GRA0288	MacRenderMan & Showplace Bundle	639.

Praxitel
❼UTI0211	Read My Lips	75.

The UnMouse
(Microtouch) ❼ The UnMouse does everything a mouse can—only faster, easier, and in less space. To move the cursor, simply slide your finger over the glass surface. To make a selection merely press down. The UnMouse also serves as an extended keyboard. Tap the large red button and you have a Power Keypad with 16 keys instantly available to execute macros (60 in advanced mode). With its one million touch points the UnMouse also performs as a small graphics tablet. **INP0084 $159.**

Word Search Deluxe
❼ Perfect for newsletters, classrooms, and puzzle enthusiasts everywhere. Fun to create. Fun to play. Improve your vocabulary in any subject. Use as stand alone application to create, play and print word search puzzles or use in combination with word processing, paint and page layout programs for more decorative results. Supports color and digitized sounds. **EDU0276 $35.**

ProModem 2496 S/R Minifax Plus
Complete data/fax solution in a mini-size. Get up to 9600 bps throughput on this 2400 bps data modem with V.42bis/MN-5 data compression and error correction. Plus you get 9600 bps send/receive fax, all the software, and cable. **MOD0076 $279.**
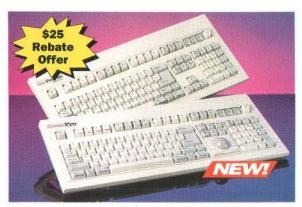
Wingz 1.1
❼Wingz HyperScript programming language makes custom applications easy to create and use. Incredible 2D and 3D graphics (in color on the Mac II). Wingz provides over 20 different graph types, and you can rotate, elevate, and change the viewing perspective freely. **BUS0064 $245.**

Utilities Family
(Microcom) ❼ The **Virex** application program detects and repairs files infected by Macintosh viruses. The Virex 3 INIT repairs damanged files instantly before a virus can spread. **911 Utilities**, a collection of disk and file recovery tools, protects computer-based information from loss or damage so you'll never have to worry when your Mac goes down. **Complete Undelete** maintains a "Delete Log" of files thrown in the trash and recovers them if they were accidently thrown away. **Citadel** with Shredder, a security tool box, protects your computer from unauthorized access.

Virex UTI0093 $59.
911 UTI0191 $89.
Complete Undelete UTI0140 $49.
Citadel UTI0233 $93.

$25 Rebate Offer

NEW!
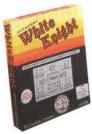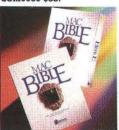
White Knight V.11
❼The perfect low-cost solution to almost any Mac User's telecommunication needs. Offers the kind of power associated with products costing hundreds of dollars more. Winner of 11 awards including MacWorld's World Class Software Award. **COM0060 $85.**

MacBible - King James Version
❼Revolutionize the way you study the Scriptures. Includes a flexible word-and-phrase search mode, a verse mode for displaying any range of verses, and a count mode for showing statistical information about words. **BOK0021 $79.**

BeagleWORKS
❼This new, integrated program offers a full-working word processor with spelling checker and thesaurus, spreadsheet with charting, database, paint, draw and communications modules all in one package. Lets you combine data from all other modules into a single document and make changes (edit in context) without leaving that document. **BUS0189 $209.**

TrakPro
(Key Tronic) ❼ Features a 101-key layout similar to an Apple Extended keyboard, with the convenience of an integrated trackball. Includes 7 user-definable buttons with Control Panel software, interchangeable Caps Lock and Ctrl keys, Period/Comma lock, adjustable key feel. **INP0192 $219.**

MacPro Plus
❼ Compatible with all Macintosh computers, the enhanced 105-key layout includes Period/Comma lock capability. Also, the connecting cable you need is offered at no extra charge. The keyboard is backed by a limited-lifetime warranty and unlimited toll-free product support. MacPro Plus comes with a $25.00 trade-in offer direct from Key Tronic on most Mac compatible keyboards when you purchase the MacPro Plus. Both keyboards Include a Free offer for Tempo II. **INP0156 $145.**

Strata		
❼GRA0274	StrataVision 3D 2.0	629.
SuperMac		
❼GRA0253	PixelPaint 2.1	159.
❼GRA0249	PixelPaint Professional 2.0	499.
T/Maker Co.		
GRA0039	ClickArt Business Image	32.
GRA0272	ClickArt Color Graphics for Presentations	99.
GRA0088	ClickArt EPS Illustrations	82.
GRA0270	ClickArt-Events and Holidays	32.
Virtus		
❼GRA0278	Virtus WalkThrough	259.
Zedcor		
❼GRA0199	DeskPaint & DeskDraw 3.03	113.

INIT Info Pro (Baseline)❼ The most complete list of INIT and application conflicts in existence. Includes hundreds of pages of facts and provides HyperCard stacks which examine all the drives connected to your Mac and complies a report of the problems. **UTI0238 $39. Talking Moose** uses charming, random messages to relieve the tedium of working long hours on your Mac. **ENT0351 $23. Screenshot** makes capturing the image simple and easy. Hit the user-definable key combination and the CDEV pops up a menu to specify whether you want to print it or save it. Captures whole screen windows, menus, or selected portions of the display. **UTI0183 $34.**

HARDWARE & PERIPHERALS
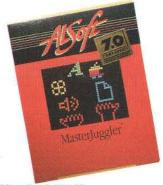
Caere		
❼INP0205	TypistPlus	479.
CoStar		
❼INP0198	LabelWriter II	199.
Epson		
INP0167	Epson EPL-7500 Laser Printer	2599.
INP0173	Epson PostScript Kit	1599.
Seikosha		
INP0041	Seikosha SP 2000 AP Printer	235.
Sharp		
COMP007	Wizard OZ 7000 (32KRam)	229.
COMP018	Wizard OZ 7200 (64KRam)	255.
COMP019	Wizard Oz 8000 (64KRam)	329.
COMP023	Wizard Oz 8200 (128KRam)	399.
ThunderWare		
INP0116	LightningScan 400	385.
INP0189	LightningScan Pro 256	539.
❼INP0007	ThunderScan Plus	199.

INPUT & OUTPUT

Abaton		
❼INP0157	Scan 300/Color	1499.
INP0164	LaserScript Printer LX	1729.
Articulate Systems		
❼INP0160	Voice Navigator II	649.
Datadesk International		
INP0174	Mac101E Keyboard	129.
INP0183	Mac 101E Keyboard w/Quickeys 2	149.

Digital Vision, Inc.		
GRA0145	Computer Eyes B & W	199.
❼GRA0154	Computer Eyes For Mac-Color	349.
ICD		
INP0095	Graflex	82.
Kensington		
INP0060	Turbo Mouse ADB (SE or II)	109.
Key Tronic		
❼INP0156	MacPro Plus	145.
❼INP0192	TrakPro	219.
Koala		
INP0127	MacVision 3.0	269.
Microspeed		
INP0126	MacTRAC 2.0	75.
INP0140	MacTRAC DB9	62.

Microtek		
❼INP0180	Microtek ScanMaker 600ZS	1599.
❼INP0176	ScanMaker 1850S	2369.
❼INP0162	TrueLaser Printer	2019.
MicroTouch		
❼INP0084	The UnMouse	159.
Mouse Systems		
❼INP0132	Little Mouse ADB	74.
❼INP0199	A³ Trackball	75.

The "ULTIMATE" SE Carrying Case (I/O Design, Inc.) The "ULTIMATE" SE Carrying Case is designed with the same high quality standards as other MacLuggage products. This case offers internal, padded compartments for ANY Macintosh keyboard, mouse, external hard disk and cables, also holds the new Macintosh Classic. It features 2 additional exterior pockets for everything from disks to umbrellas. Combine these features with sturdy Dupont Cordura nylon and 1/2 inch high density foam padding and you'll see why this is the "Ultimate" carrying case for your Mac. Available in black and navy blue. **Black: ACC0427 $85. Navy: ACC0440 $85.**

MasterJuggler™ 1.57
(AlSoft, Inc.) ❼ MasterJuggler™ 1.57 is system 7.0 compatible. It greatly extends the power of your Macintosh and System 7.0 by giving you instant access to unlimited numbers of fonts, DAs, FKeys, and sounds. You can easily use up to 120 of these resource files without having to install them in your System file. MasterJuggler has full support for the new True Type fonts and Balloon Help. MasterJuggler also lets you start applications and their documents or switch between them from a convenient pop up window. *MacUser* 5 Mice rating. **UTI0110 $55.**

Sophisticated Circuits		
ACC0535	Power Key w/Quickeys Lite	64.
ACC0619	Power Key Remote	35.
Wacom		
INP0151	Digitizing Tablet 12" x 12"	845.
INP0177	Digitizing Tablet 12" x 12"-Electrostatic	929.
INP0179	Dizitizing Tablet 6" x 9"	589.

MEMORY UPGRADES & ACCELERATORS

Connectix		
❼DRI0385	MC73	159.
UTI0144	Virtual 030 2.0 VM3	113.
DRI0185	Virtual 2.0 PMMU	188.
DayStar Digital		
❼DRI0224	64K FastCache IIci	279.
❼DRI0288	40 MHz PowerCache (IIci)	959.
❼DRI0290	50 MHz PowerCache (IIci)	1699.
❼DRI0416	RAM PowerCard	749.
Dove		
❼DRI0130	MaraThon 030 (MacII)	599.
❼DRI0198	MaraThon 030 - (Mac SE)	399.
❼DRI0197	MaraThon 030 - (Mac Plus)	399.
❼DRI0151	MaraThon 030-SE/030	599.
❼DRI0380	Marathon Racer For Mac II	1079.
❼DRI0378	Marathon Racer For Mac Plus	599.
❼DRI0379	Marathon Racer For Mac SE	599.
Impaq		
CHP0043	512K Video SIMM Upgrade	149.
Micron Technology		
❼DRI0321	PicturePress Card (Xceed ICDP-II)	745.
MicroTech International, Inc.		
CHP0025	Mac Classic 1 Meg Upgrade	79.
CHP0026	Mac Classic 3 Meg Upgrade	179.
DRI0315	Mac Classic Upgrade Kit 20-1	399.
DRI0317	Mac Classic Upgrade Kit 40-1	499.
DRI0318	Mac Classic Upgrade Kit 40-3	575.

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QuickTools™
(Advanced Software) ❼ A collection of eight Macintosh utilities. Just pop them into your system folder and the way you use your Mac

will change forever. You can make QuickTools work the way you want by changing easy-to-understand settings in your control. **UTI0239 $45.**

Intouch 1.0
❼ Convenient DA that stores an unlimited number of names, addresses, and phone numbers. Also prints envelopes and mailing labels, and even dials the phone for you. **UTI0192 $39.**

Docucomp 1.5
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MUS0036	MacRecorder® 2.0	174.

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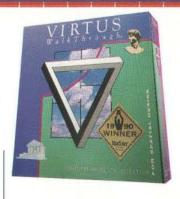
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❼UTI0240 NUM 1.1 & SAM 3.0 Bundle ..... 119.
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❼LNG0002 THINK's Pascal 4.0 .... 165.
Zedcor
❼LNG0031 ZBasic 5.0 .... 99.
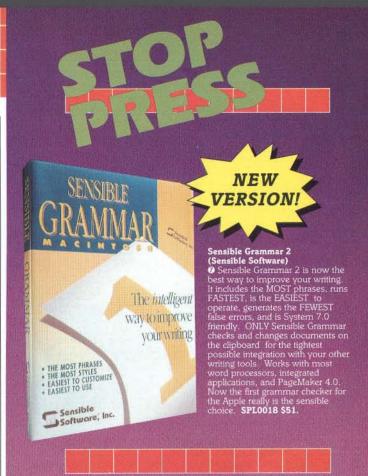
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One Image, Many Uses

A single computer-generated illustration can easily be adapted to fit a variety of output formats.

By Janet Ashford

S ome illustration jobs, such as marketing campaigns, call for the same images to be used in several sizes and shapes. With conventional artwork, this can mean lots of expensive camera work or even redrawing the images. But electronic illustration programs such as FreeHand, Illustrator, Canvas, and MacDraw can save time and money by allowing you to easily edit images to fit any format and to add or subtract elements without redoing the entire graphic.

Don Baker, a Seattle-based illustrator, designed point-of-purchase materials for Heublein's Cinco de Mayo promotion of Jose Cuervo tequila. Using FreeHand, Baker designed a 19-x-36-inch poster first. After Heublein had approved it, he adapted the artwork to create a 3.5-x-6-inch table tent and a 20-x-30-inch die-cut case card.

Because Heublein has its own color-separation and printing facilities, the company requested that artwork be supplied as 4-x-5-inch color transparencies. Using traditional photography and stripping, Heublein isolated parts of the poster image to create a mobile and a menu card. These elements could also have been produced in FreeHand.

Graphic designer Janet Ashford is a contributing editor to *Step-by-Step Electronic Design*.

A poster for Jose Cuervo tequila features a festive collection of Mexican food exploding from the top of a margarita glass. The illustration was created in FreeHand, with bright, flat colors; blends; and hand-drawn type. The original 6.5-x-10-inch image was output at 3,200 dpi to a 4-x-5-inch transparency and then enlarged and color-separated conventionally to a finished size of 19 x 36 inches.

1 Creating a Margarita Glass

A lime-green shape is positioned inside the bowl of a hand-drawn margarita glass, and four overlapping shapes are placed above it. The largest serrated shape is drawn with FreeHand's pen tool. Three copies, colored with different shades of green, are resized and layered on top of one another.
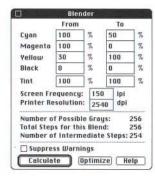
2 Adding Details

Zigzags, swirls, and bits of solid-colored confetti are drawn over the "food explosion," and shapes filled with green and blue gradations give the contents of the glass a rounded, liquid look. Orange highlights and blue gradations make the glass stem and base look shiny.

3 Drawing Food Items

(a)   (b)

Various items of Mexican party food — tacos, peppers, chips, and limes — are drawn, with solid-colored objects defining the basic shapes (a) and smaller shapes filled with gradations adding shading and texture (b). The components of each food image are grouped to keep them together. Many of the food images are copied, rotated, and edited slightly to create varied duplicates, then placed over the explosion background.

4 Calculating Optimum Blends

Blender				
	From		**To**	
Cyan	100	%	50	%
Magenta	100	%	0	%
Yellow	30	%	100	%
Black	0	%	0	%
Tint	100	%	100	%
Screen Frequency:	150	lpi		
Printer Resolution:	2540	dpi		

Number of Possible Grays: 256
Total Steps for this Blend: 256
Number of Intermediate Steps: 254

☐ Suppress Warnings

[Calculate] [Optimize] [Help]

A blend can have up to 254 intermediate steps between the beginning and ending colors. To determine the minimum number of steps required to make each blend look smooth, Baker uses a free DA called Blender. For the blend in Figure 5, he enters the CMYK values of the two end colors, the screen frequency, and the output resolution. Clicking on the Calculate button gives him the recommended number of steps.

5 Substituting Blends for Graduated Fills

(a)

(b)

(c)

The illustration's gradations are originally done with FreeHand's graduated fill option, which automatically creates a transition between two colors within a selected shape. However, Baker learns from his service bureau that the Blend command produces smoother-looking gradations on transparencies. He therefore converts the larger areas of gradation, such as the shading on the margarita glass (a), into blends. (A blend resembles a graduated fill, but it creates a transition between two *objects* and the user can specify the number of intermediate steps.) First, two thin rectangles are created, each filled with one of the end colors, and blended together. The original shape is then selected, given a line weight and a fill of None (shown here with a black outline for visibility), and positioned over the blend (b). Finally, the shape is used as a clipping path to hide the unwanted parts of the blend (c). In FreeHand, this masking process uses the Paste Inside command; in Illustrator, the analogous feature is called Mask.

6 Adding Type

(a)

(b)

(c)

(d)

To create the lettering for the title "Cinco de Mayo," Baker first traces the basic letterforms from a scanned pencil sketch (a). He adds decorative elements to the letters and creates drop shadows by cloning each character, offsetting it slightly to the left, and changing the fill color to red (b). He makes the hole and drop shadow inside the letter *O* by drawing an oval, filling it with black, and offsetting a red clone to the right. The lettering for the margarita glass and Jose Cuervo logo is scanned and traced from art supplied by Heublein (c), and the ornate lettering on the tiny tequila bottle is traced from the type on an actual bottle and rotated into position (d).

7 Creating the Background

To complete the illustration, Baker creates a colorful, active background consisting of simple green dancing figures and yellow triangular decorations. Some of the figures and decorations are duplicated, and the copies are rotated or flipped to produce new elements. All of the elements are arranged on a rectangle filled with bright red (see Figure 8a).

8 Generating a Two-Layered Display

(a)　　　　　　　　　　　　　(b)
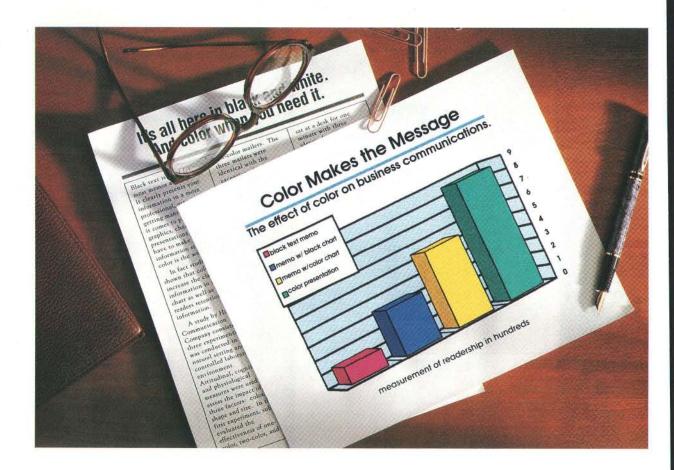
Heublein wants to use the same artwork for a two-layered die-cut case card, so Baker distributes elements of the original illustration into two new documents. One graphic, which forms the inside of the case card, contains just the dancing-man background and some extra confetti (a). This background is edited to fit the slightly wider format of the card. The second graphic — the cover of the card — contains the foreground elements and the black border (b); the interior white space will be cut out so that the second image shows through. To make it easier to separate the original illustration into two parts, Baker creates the black border by framing the central image with separate black strips rather than by drawing a large black rectangle behind the entire graphic.

9 Creating the Table Tent

The table tent is a 3.5-x-16-inch strip that folds in half to create a two-sided display with a base. One side features the same art as that used on the poster, which is resized to fit the smaller space. The other side features a new graphic that includes some elements from the poster (margarita glass, Jose Cuervo logo, and title type) plus two new glasses. The shimmering look of the beer mug and cocktail glass are created with the techniques described in Figure 2, using shapes filled with solids and gradations that mimic the look of colored liquids seen through glass. The second image is rotated 180 degrees so that it will be right side up when the tent is folded.

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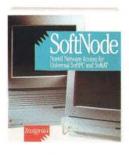
We Connect People And The Computers They Use.℠

Apple's not the only system-software vendor that's licensing key technologies from third parties these days. Microsoft has acquired rights to the algorithms behind Insignia Solutions' SoftPC, which emulates DOS computers on a Mac. What do you suppose Microsoft plans to do with that capability? Windows for Macintosh, perhaps? Chilling thought.

By Henry Bortman

More DOS and PC news: Insignia ([415] 694-7600) now offers SoftNode for SoftPC (for a single user, $175; for ten users, $1,150), which lets Macs act as DOS NetWare clients, accessing data files and DOS applications directly from a NetWare server. ◆ If you'd rather translate than integrate, check out version 6 of MacLinkPlus/PC, from DataViz ([203] 268-0030). This version ($199) adds support for DOS machines running Windows and offers new translators for Windows-based applications. Under System 7, it adds a "drag to translate" capability: Drag a file to be translated over the MacLinkPlus icon, and the translator application launches automatically.

Mainframe machinations: Avatar and Tri-Data have merged into a single company, to be called Avatar ([508] 435-3000), which will now command the lion's share of the Mac-to-mainframe market. Most of the products from each company will be retained, but their competing front-end 3270-terminal-emulation products will be merged into a single application. Avatar's NuBus-based gateway products will be geared toward small-to-medium-sized Mac networks that need access to IBM mainframes; Tri-Data's external gateway products will support larger networks. ◆ For those looking to develop Mac-like front ends to mainframe applications, the field has a new entry: Blacksmith, from CEL Software ([403] 463-9090). Blacksmith front-end applications will work with 3270 connections from Avatar (including Tri-Data), DCA, and Apple. $2,900 for the development package, which includes two days of training; $195 per user for the run-time version.

Management mania: Pharos Technologies ([513] 984-9273) will add some smarts to Mac-system management with its Personal*STATUS application, due in early 1992. Designed for individual users rather than network managers, it profiles users' machines. Then using "agents" — scriptlike modules that are up-to-date on software versions, compatibility problems, and the like — Personal*STATUS suggests upgrades or installs them for you across a network (right). Price should be less than $120 per user. ◆ netOctopus (ten users, $645), from MacVONK ([215] 660-0606), allows software updating over a network and provides flexible sorting and searching capabilities that help network managers locate anomalies quickly. It's also the only system-management application that lets you collect information about users' machines by using the Responder INIT (part of the Mac's system software) instead of installing a custom INIT. ◻

A New Way to Share

AppleShare 3.0 is more flexible than its predecessor, but our first look says you'll pay in performance.

By Henry Bortman

You've been using AppleShare 2.0.1 for a while. Then along comes System 7. It has file sharing. Being the adventurous type, you upgrade the clients on your network. You even briefly think, "Maybe I won't need AppleShare anymore." Until you learn about the limitation of System 7 file sharing: Only ten users can be logged on at a time. That's good enough for light user-to-user file transfers but hardly enough for the industrial-strength file serving that network users require. Besides, file sharing is slower than using AppleShare.

Then you hear about the Macintosh Quadra 700 and 900, Apple's new top-of-the-line speed-demon Macs. So you figure that you'll move your AppleShare 2.0.1 server onto the new hardware and watch file sharing really fly. Until you learn about the *Quadras'* limitation: They require System 7.0.1, and AppleShare 2.0.1 doesn't run under System 7. Bummer.

That's where AppleShare 3.0 comes in. Naturally, the MacUser Labs NetWorkShop crew was curious, so we took a quick peek at a prerelease version. What we found was that Apple's new server software is long on features but short on performance. Bear in mind that what we looked at was beta software running on beta hardware. Still, the results should give you a hint of what to expect from the shipping version.

What's New

The most immediately obvious difference between AppleShare 2.0.1 and 3.0, as pointed out earlier, is that 2.0.1 doesn't run under System 7 whereas 3.0 requires it. This has a positive side: The new AppleShare, unlike the old, can run as one of many programs active simultaneously on the same Mac. Previous versions of AppleShare took over the CPU, permitting only a single additional active application in the background. With AppleShare 3.0, you can run a print-server, a mail-server, and a database application — and as many other applications as you have RAM for — all on the same machine. Your AppleShare 3.0 server can even be a user's workstation. Of course, if you overload your server Mac, its performance will suffer.

Many of the features of AppleShare File Server 2.0.1 have been expanded or extended. The previous limit of 50 simultaneously connected users has been increased to 120 (administrator-settable) with version 3.0. With 2.0.1, all disks of all hard drives connected to the server had to be AppleShare volumes. With 3.0, some hard disks can be kept as private local volumes and others shared and you don't have to share entire hard disks. For the security-conscious, individual folders can now be shared as volumes.

Password protection has also been enhanced (see Figure 1). A server's administrator can set a minimum password length of one to eight characters. (Longer passwords are harder to guess.) Your administrator can require you to set a password the first time you log on to a server volume and to change it periodically in order to maintain access.

More goodies for administrators: They can now send all their AppleShare 3.0 clients any message they like, not just warnings of impending server shutdowns. They can also set

Figure 1: AppleShare File and Print Server 3.0 provides several new administration features, including a variety of password-control options and the ability to set the maximum number of logged-on users as high as 120.

messages to appear on client users' screens whenever they log on to a server. (This can be annoying if you log on to a server automatically when you boot your Mac: You have to be around to click on the OK button before booting can finish.)

And a feature many server administrators have long been waiting for: They can now eject and mount CD-ROMs that are connected to the server without having to shut the server down first.

Finally, AppleShare Printer Server, formerly a separate package, is now bundled with AppleShare File Server. Of course, this comes at a price. The now-discontinued AppleShare 2.0.1 File Server cost $799 and 2.0 Printer Server $299. The AppleShare File and Print Server 3.0 package, which includes both print- and file-server software and which replaces both of the earlier products, will set you back $1,199. Details on Apple's upgrade program were not available at press time, but a spokesperson said that the upgrade would be in the $200-to-$300 range.

Disappointing Performance

If you're under the impression that new software is always faster than old software, you'll be even more disappointed with AppleShare 3.0 than you were with System 7. It's slower (see Figure 2).

For comparison, we ran a basic set of file-server tests on three different server platforms: AppleShare 2.0.1 on a IIfx, AppleShare 3.0 on a IIfx, and AppleShare 3.0 on a Macintosh Quadra 900. In each case, we used an extremely fast 1.3-gigabyte hard drive — PLI's PL 1.3 Elite — and connected our clients to the server via EtherTalk, using Asanté's Ethernet cards and NRC's MultiGate Hub. We ran two file-transfer tests: In one test, we read a folder containing two 500K files from the server to a IIci; in the other, we wrote a similar 1-megabyte folder to the server from a IIci client. For each test, we added a varying load of up to 20 additional users, all performing a similar task. We performed each test five times.

The results were disturbing. Under the heaviest load (21 users), AppleShare 3.0 running on a IIfx was, on average, 27 percent slower than AppleShare 2.0.1 on the same machine. AppleShare 3.0 was 32 percent slower when reading files from the server to a client, the most common activity for users logged on to a file server. However, the performance of 3.0 on a Quadra 900 was faster than 3.0 on a IIfx by roughly the same percentage. In the 21-
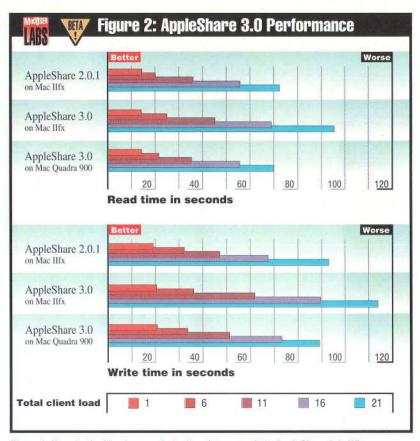
Figure 2: If you're looking for speed, don't rush to upgrade to AppleShare 3.0. When we measured the time one client took to read a 1-megabyte file from (top) and write it to (bottom) a (beta) 3.0 server, under a varying client load on the network, we found that we had to run 3.0 on Apple's new 68040-based speed-demon Quadra 900 (also beta) just to keep up with the old AppleShare 2.0.1 running on a IIfx.

client tests, the 68040-based Quadra 900 was, on average, 24 percent faster than the IIfx, gaining 27 percent over the IIfx on file reads.

In other words, if you've been running AppleShare 2.0.1 on a IIfx and want to make the upgrade to 3.0, you will need to make a significant hardware-upgrade investment just to stay in place on the performance curve. If you're planning such a cash outlay, you may be able to ease the checkbook strain a little by upgrading an old IIcx or IIci to a Quadra 700, which Apple claims has identical performance to the 900. The main advantages of the 900 over the 700 are additional NuBus slots and increased internal storage capacity.

Note also that our tests were conducted over an EtherTalk network. If you're running on LocalTalk, your network bandwidth — not the performance of your server hardware or software — may be the bottleneck. Upgrading to AppleShare 3.0

on LocalTalk may not degrade your server's performance as severely as it does on EtherTalk.

3.0's a Charm?

Would it were so. We would like to have seen expanded features *and* increased performance in Apple's new version of its file-server software. But if the beta results are any indication of what to expect from the final release, it looks as though the big reason to switch to AppleShare 3.0 is its increased flexibility. From the standpoint of speed, it's none too impressive. So if you do upgrade for the features, plan to factor in the cost of a hardware upgrade at the same time — unless you're the type of network manager who likes to get those Post-it notes on your door from users complaining, "Something's wrong. The network just got slower." 🖰

Henry Bortman is *MacUser*'s technical director.

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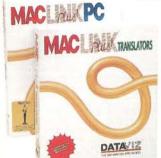
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AppleTalk Remote Access

With Apple's new software, remote access is better than the next best thing to being there.

By Stephan Somogyi

With the introduction of the PowerBooks, Apple has solved two problems: how to work away from your desktop Mac and how to use your Mac when you're on the road. AppleTalk Remote Access, which ships with every PowerBook and is also available as a stand-alone package ($199 for three users), lets you dial up your Mac and work with it — and your AppleTalk network — as if you were actually there.

Getting started with Remote Access requires some user setup. The Remote Access Setup control panel lets you choose the modem model you're using as well as other modem-related settings.

The second part of the Remote Access Setup control panel is network-related. You select if Remote Access should answer incoming calls, and you set the maximum connection time. Remote Access is smart enough to arbitrate the serial port, so you can use other telecom software to dial out even while Remote Access is in Answer mode. Apple's software automatically permits the connection and then returns to Answer mode when you've made your outgoing call. Last, you select whether the remote caller has full access to the network or access only to the Mac connected to the modem.

AppleTalk Remote Access requires System 7 and is tightly integrated with it. For example, Remote Access uses the same Users and Groups paradigm that System 7 file sharing does.

Another example of excellent integration is Remote Access' alias support. The package includes an extension that lets aliases remember their connection information, so any alias that points to something on the other side of a Remote Access link can start a connection when you double-click on the alias.

The AppleTalk Remote Access package also includes an application that lets you create connection documents containing a user name, a password, and a phone number to dial for setting up a link. You can also specify whether the password should be entered automatically and whether you'd like a reminder of an existing connection every few minutes.

For security, AppleTalk Remote Access contains several levels of protection. The first is a password. The second, callback, means that if a user dials in and is validated, the connection is broken and the remote Mac calls the originating Mac, using the phone number in the remote machine's Users and Groups entry. The third is that once you're connected, all the standard network-security mechanisms such as AppleShare passwords still apply.

Naturally, a modem-based connection to a remote network doesn't have even LocalTalk's bandwidth. However, Apple-Talk Remote Access employs several levels of data compression and built-in error correction for relatively high throughput even over a modem. Although network access at 2,400 bps can be painfully slow at times, a 9,600-bps connection is very usable. We tested Remote Access with CE Software's QuickMail and with Farallon's Timbuktu (*not* Timbuktu/Remote) over a 9,600-bps connection and got more than acceptable results.

Products such as Global Village's TelePort/Lap V.32 9,600-bps internal data modem will make using Remote Access very practical. And Apple has its own alternative: a 2,400-bps data/9,600-bps fax-send modem. Apple's modem comes with Chooser-level fax software that lets you send a fax from any application as easily as if you were printing a document. By press time, Global Village will also have a 24/96 modem, called the TelePort/LapFax, which will come with Global Village's own fax software. If you know that you'll be dialing in to a network often, a 9,600-bps modem is a must. However, if you need the fax capability and dial in only infrequently, a 24/96 modem might be a better choice.

AppleTalk Remote Access won't replace Farallon's Liaison or Shiva's remote-access products. Liaison is a full router that also provides dial-in and is comparatively complex to set up. Shiva's product requires a NetModem and must be set up by a network administrator. Liaison and Shiva's products remain viable, however, because they can be managed centrally and because they offer features such as routing. Remote Access is a decentralized product: There is no server and no client, both Macs use the same software, and the minimal amount of setup required is simple enough for even novice users.

With AppleTalk Remote Access, you can now work with your office network and desktop Mac almost as easily as if you were sitting at your desk. All your files, servers, and printers are as readily accessible as if you were really there. If you call in from the road — or from home — AppleTalk Remote Access should be an essential part of your travel kit.

Network administrator Stephan Somogyi is immensely pleased that, thanks to Remote Access, he can engage in corporate-E-mail warfare while being physically far, far away.
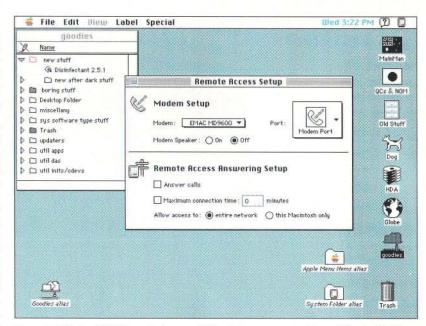
Figure 1: With AppleTalk Remote Access, dialing in to your remote Mac and the AppleTalk network to which it's connected produces a desktop on your local Mac that looks as if you're really there. The Goodies alias at the lower left of the screen was used to initiate a remote connection and access the Goodies server volume across the remote link. The Remote Access Setup control panel lets you select the modem and serial port to use in addition to network-access parameters.
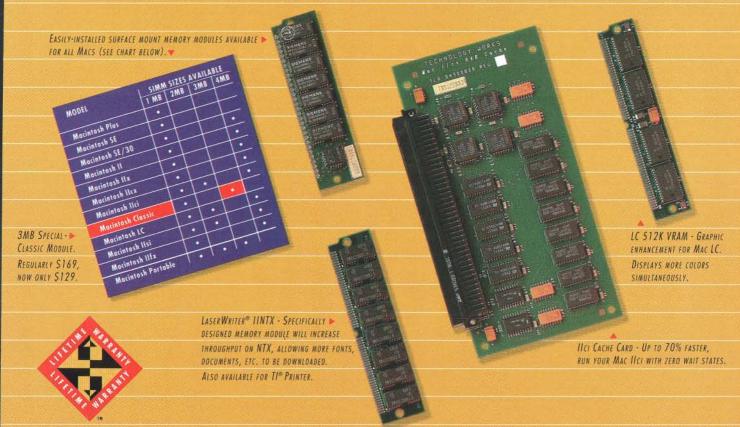
Figure 2: AppleTalk Remote Access' additional features are integrated seamlessly into System 7's Users and Groups file-sharing paradigm; each user also has remote-access privileges and a callback phone number.

Making the Switch

For those who want to upgrade their sluggish LocalTalk network, the LocalSwitch is an economical alternative to Ethernet.

By John Battelle

The Mac is the world's best-connected computer, thanks to its built-in LocalTalk networking. But despite its convenience, LocalTalk does have limitations. Apple's implementation of LocalTalk requires a network to be set up in a daisy chain, uses specialized wiring, and works over relatively short distances. More importantly, LocalTalk has a limited *bandwidth,* which governs the amount of data that can be passed through a network at a given time.

LocalTalk transmits data at just 230 Kbps (kilobits per second) in a linear fashion — one data packet at a time is broadcast to all network nodes. The narrow bandwidth can result in agonizingly slow response times when a network is saturated by tasks such as printing, E-mail, and file sharing. The problem is sure to worsen as System 7's built-in file sharing and interapplication communication bring more network traffic on-line.

Several companies, most notably Farallon Computing and Nuvotech, have circumvented some of LocalTalk's limitations with multiport repeaters, also known as *hubs* or *concentrators.* These devices amplify, or repeat, Local-Talk signals to increase network distances; use standard twisted-pair (telephone) wiring; and have a dozen or more ports so you can set up a LocalTalk network in a star configuration. They do nothing to relieve the problem of LocalTalk's limited bandwidth, however.

When a network becomes permanently congested, most network managers have two choices. They can either subdivide their LocalTalk network with routers, or they can switch to what seems to be the only alternative to LocalTalk: Ethernet, which has a generous bandwidth of 10 Mbps (megabits per second). Routing is only somewhat effective, however, and it can create a maze of zones through which users must navigate in the Chooser. Although Ethernet is fast, it's expensive and requires installation of a card in each machine on the network.

Enter the LocalSwitch

Now Tribe Computer Works offers a third solution — the LocalSwitch, a 16-port hub with a difference. The LocalSwitch has all the advantages of a multiport hub, such as Farallon's StarController or Nuvotech's TurboStar, plus it has special processors that let it cleverly bypass LocalTalk's bandwidth limitation. These processors can divide Local-Talk traffic into as many as eight simultaneous "conversations," each at the full 230-Kbps LocalTalk bandwidth. Each network conversation (a print job, for example) is broadcast only between the two affected nodes (in this case, a Mac and a printer), leaving the rest of the network free for other traffic. This point-to-point linkage, called *packet switching* or *parallel transmission,* effectively boosts the network bandwidth to as much as 3.6 Mbps.

The LocalSwitch is easy to install. Its pinout is identical to those of the StarController and the TurboStar, and the first page of the manual

describes how to replace these two hubs. All you do is take the 50-pin Amphenol cable that connects your patch panel or punch-down block to the hub and plug it in to the LocalSwitch; Tribe also provides an

Amphenol cable. Unlike the StarController or the TurboStar, the LocalSwitch can be mounted on a standard 19-inch rack. For connectivity novices who don't already have a modular RJ-11 or RJ-45 patch

panel for easy network reconfiguration, Tribe sells them for $395 each.

Each of the LocalSwitch's 16 ports can be used for one node or a subnet of nodes, although the hub's performance decreases as more nodes are added to each port. As with any hub, you can use a port to link the LocalSwitch via a router to an Ethernet backbone or to daisy-chain it to another LocalSwitch. Each port has a tricolored light that blinks red when it receives data, blinks green when it transmits data, and glows amber when it's disabled.

Because the LocalSwitch segregates network traffic by setting up direct links

The LocalSwitch hub can provide a cost-effective alternative to Ethernet.

between communicating ports, you should make port assignments based on how the network is used. You can give each heavily used resource, such as a file server or a network printer, its own port. If you isolate local traffic, such as that between one Mac and a personal printer, on a port, it won't affect the rest of the network. Configuration strategies are covered in Tribe's detailed manuals, which describe how to optimize a network around this new technology.

The LocalSwitch is controlled by elegantly simple administration software called SwitchMonitor, which automatically finds all the LocalSwitches on your network and provides three displays for each hub, which you select from a pop-up menu. The Statistics display offers information on errors and on packets sent and received. It also shows a bar chart representing each port's activity (see Figure 1). You can save this information as a text file for analysis in a spreadsheet or database. The Network display lists all the AppleTalk devices on the network; the Configuration display lets you turn ports on or off and enter comments about each port.

The LocalSwitch presents one significant obstacle to network management. Because the LocalSwitch creates point-to-point connections, network-management software such as Apple's Inter•Poll or Neon's NetMinder LocalTalk cannot "see" devices connected to the hub's other ports; they can see only the nodes on the port they are using. If you want to monitor

all the nodes on the network, you are limited to SwitchMonitor's network-management features.

Speed Booster

To put the LocalSwitch through its paces, we set up a 12-node network that consisted of three Mac IIfx's (two Apple-Share servers and one QuickMail server), one LaserWriter IINTX, four Mac IIci clients, and four Mac IIsi clients. Half of the clients ran System 6.0.7; the other half ran System 7. Using this setup, we compared network performance with the LocalSwitch against the performance of a LocalTalk network with a Farallon Star-Controller hub and an Ethernet network with a StarController EN hub.

Our first test simulated network traffic in a typical workgroup situation. For each hub, we timed a suite of five network-intensive events: sending a memo with several enclosures to a QuickMail server; downloading a 5-megabyte folder from an AppleShare server; printing a 32-megabyte text document; transferring a 1-megabyte file, using System 7's file-sharing capability; and uploading a 5-megabyte folder to a second AppleShare server. Each event was initiated by a different client. Altogether, ten nodes were busy requesting or receiving data through this beleaguered network.

To ascertain base times, we had previously timed each event in isolation. If Tribe's parallel-transmission claims were true, the LocalSwitch would be able to complete all five events in about the same time it took LocalTalk to perform the longest isolated LocalTalk event — the 5-megabyte upload — with minimal extra time for packet-switching overhead.

Our results proved that the LocalSwitch works as advertised (see Figure 2). It finished the suite of five events in a little more than half the time it took LocalTalk to complete the suite — 309 seconds versus 564 seconds. The LocalSwitch completed each member of the suite of five simultaneous events in almost the same time it took LocalTalk to run that event in isolation. The LocalSwitch's overall time (309 seconds) was nearly identical to the time required for LocalTalk's longest isolated event (317 seconds). This means that the LocalSwitch can dramatically reduce the bottlenecks created by LocalTalk's bandwidth constraints. When our network was at its busiest, the LocalSwitch showed almost no change in performance but the LocalTalk hub slowed considerably.

When Ethernet Is Better

The LocalSwitch can't match Ethernet in terms of raw throughput, however. As we expected, the Ethernet network was considerably faster for most events. When we ran the test suite, the 5-megabyte upload was completed in 75 seconds on Ethernet versus 309 seconds on the LocalSwitch. In addition, our suite of five events consumed only 10 to 15 percent of
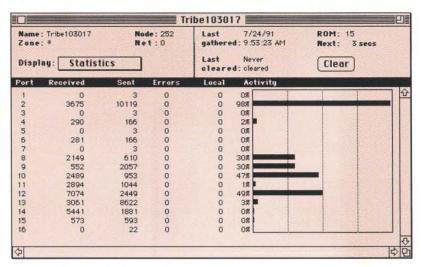
Figure 1: The LocalSwitch's administration software, SwitchMonitor, can provide network-traffic statistics and dynamically display the hub's traffic, port by port.

Ethernet's bandwidth. So if you need to move large files across a network with the utmost speed, Ethernet is still the best choice.

Whereas our first test focused on multiple demands for separate resources, the second test focused on multiple demands for a single resource. We copied an identical 1-megabyte folder from a IIfx server to six client Macs. This test simulates a workgroup situation in which many clients are demanding the resources of one database server, for example, or are printing exclusively to one printer. In this scenario, where everyone is communicating with the same node, we suspected that the Local-Switch would offer no significant improvement over LocalTalk.

The results confirmed our expectations. The LocalSwitch's performance was actually somewhat worse than that of Local-Talk, probably because of the overhead of coordinating its internal packet-switching tables. So if your workgroup is constantly banging on one database and you need more elbowroom, Ethernet is again the best choice.

The Bottom Line

If performance on your LocalTalk network has slowed to a crawl, you're probably considering adding routers or converting to Ethernet. If your network has only one or two significant bottlenecks — a printer that is heavily used by one workgroup, for example — the best choice may be to install a LocalTalk router to create a zone that isolates that group's traffic from the rest of the network. This is

the least expensive solution, but unfortunately, as the network grows and you add more routers, you create a confusing maze of zones.

If you want to minimize the number of zones but need more speed than LocalTalk can offer, Ethernet is no longer your only choice. The LocalSwitch packet-switching hub can eliminate LocalTalk bottlenecks in many situations, providing a cost-effective alternative to Ethernet. Swapping our test network of 12 nodes to Ethernet, for example, cost $6,730 — $1,895 for the StarController EN; $4,395 for new Ethernet boards; and $499 for EtherPrint, which connects an Ethernet network to a LocalTalk printer such as the LaserWriter. The LocalSwitch, on the other hand, costs $3,495 and provides 16 ports (the Star-Controller EN has 12). On a price-per-node basis, the LocalSwitch comes in at less than half the cost of Ethernet: $218 for the LocalSwitch compared with $561 per node for Ethernet.

Keep in mind that the LocalSwitch is best suited to networks with nodes that share a variety of resources or whose traffic can be localized in subnets. In such situations, the LocalSwitch's ability to process multiple simultaneous network signals can make LocalTalk seem to run as much as eight times as fast. If, however, you are moving lots of large files or have many nodes competing for the same file server, LocalSwitch won't help much — you're better off moving to Ethernet.

We found no bugs in either the Local-Switch or its SwitchMonitor management software, although many other more-

Figure 2: Network Performance

Figure 2: To give the LocalSwitch a workout, we timed its performance on a suite of five network-intensive events that ran simultaneously. We compared the results with those from a LocalTalk and an Ethernet network. For most events, the LocalSwitch was about twice as fast as LocalTalk, although it couldn't match the raw speed of Ethernet. The LocalSwitch's times for the network-intensive events were nearly identical to those for the same events run in isolation on LocalTalk.

powerful network-management applications have only limited use with the LocalSwitch. The manuals are straightforward and offer helpful advice on how to get the most from this new breed of network hub. Although Tribe claims that its product wasn't planned to coincide with the introduction of System 7 and file sharing, the LocalSwitch seems perfectly positioned to tackle the increased traffic of today's growing LocalTalk networks.

John Battelle is a free-lance writer in the San Francisco Bay Area who specializes in connectivity.

Get Info

LocalSwitch
♣♣♣♣½
Manufactured by: Tribe Computer Works, 1195 Park Avenue, Suite 211, Emeryville, CA 94608; (510) 547-3874.
Version: 1.05 (SwitchMonitor).
List Price: $3,495; optional patch panel, $395.

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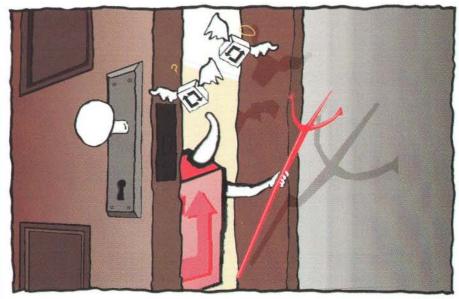
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A·Packet Full of Trouble

*You can track down
misbehaving routers
by eavesdropping
on their network
conversations.*

By Kurt VanderSluis

When you're trying to locate and fix router problems on a large network, your first goal is to determine which routers have erroneous information. AppleTalk provides the marvelous luxury of routers that can take a tiny seed of information (which networks and zones they're connected to directly) and exchange this information with other routers to deduce the structure of an entire internet and intelligently route data packets through it.

Unfortunately, one poorly configured router can cause a cascade of network trouble. A properly configured router can "learn" the internet's structure from a router that has erroneous information and then "teach" this misinformation to other routers that are also trying to learn the internet's structure. Pretty soon, strange zones may appear in the Chooser, printers and file servers can disappear, or you may experience unusually long delays when using network devices.

Sometimes you can locate routers that have bad information simply by using Apple's Inter•Poll to search for clues in zone and device names (see "Rogue Routers," November '91, page 197). This approach is useful when the problem is fairly well defined, such as when you have one or two completely misconfigured routers. However, this technique can't locate subtle problems such as zone lists that are similar but not identical or routers that have overlapping network-number ranges.
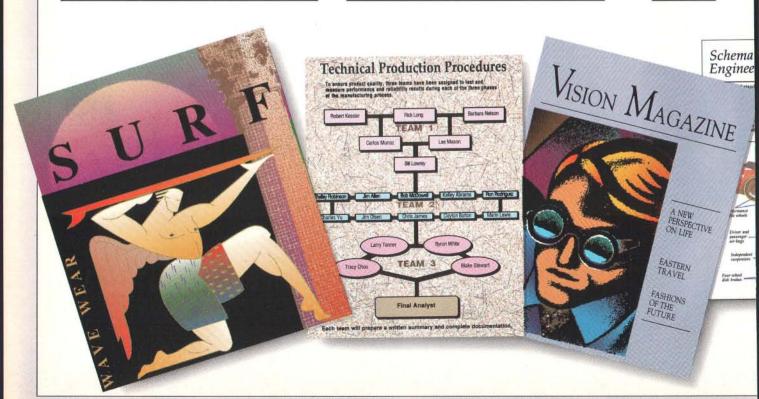
A more advanced approach to tracking down misbehaving routers is to use a protocol analyzer such as the AG Group's EtherPeek (or LocalPeek) or Neon Software's NetMinder. These software tools can capture and read the contents of the routers' RTMP (Routing Table Maintenance Protocol) packets as they zip across the network. Because protocol analyzers understand the formats and structures of AppleTalk routing protocols, they can decode the 1s and 0s in the RTMP packets and display the information in a comprehensible format. By eavesdropping on the routers' "conversations," you can figure out which routers have good information and which ones need to be reconfigured.

The most convenient place to monitor the RTMP packets is your backbone network (the network that connects all the tributary networks), because it has the most routers. Each AppleTalk Phase 2 router attached to the backbone network sends out RTMP packets that list the number of the backbone network and the numbers of any networks attached to its other ports. AppleTalk Phase 1 routers are less specific; they list the numbers of *every* network they know about.

The RTMP packets broadcast by each router should contain identical information about your backbone network. For example, if the backbone has the number 10 assigned to it, then all the routers' packets should identify it as network 10. Because the routers have different networks connected to their other ports,

Figure 1: Decoding Packets

RTMP packet	Comments

Ethernet Header
From: 08:00:89:A1:40:09 .... The Ethernet address of the router sending this packet.
To: 09:00:07:FF:FF:FF .... The AppleTalk Phase 2 multicast address.

AppleTalk Header — RTMP
To: Net 0 .... *0* means "this network," no matter what number it is.
     Node 255 .... *255* means that all nodes should read this packet.
     Socket 1 .... The router's software address for the RTMP process.
From: Net 400 ⎤
     Node 174 ⎬ The AppleTalk address of the router that sent this packet —
     Socket 1 ⎦ it corresponds to the *From* section of the Ethernet header.

RTMP Tuple #1 ⎤
Net Number: 400-699 ⎥ A *tuple* is a network description that reports the network
Distance: 0 ⎥ number of the router sending the packet and the distance
RTMP Tuple #2 ⎥ (defined as number of routers) between this router and the
Net Number: 978 ⎥ network it is describing. This router is reporting a distance
Distance: 0 ⎦ of *0* for each network, which means that network 978 and
network 400-699 are directly connected through the router.

Figure 1: A protocol analyzer such as EtherPeek or NetMinder lets you track down errant routers by reading the RTMP packets that are broadcast over the network. The decoded information on the left is part of an RTMP packet from an Ethernet router that connects a Phase 2 Ethernet internet (number range 400-699) with a LocalTalk network (number 978).

the rest of the information in the RTMP packets should be unique to each router. Using a protocol analyzer, you can collect these RTMP packets and compare the information each router is sending to see if it makes sense.

Figure 1 shows part of an RTMP packet broadcast by a FastPath Ethernet router that connects a LocalTalk network to a Phase 2 Ethernet backbone. The Ethernet backbone connects several networks, whose network numbers range from 400 to 699; the LocalTalk network's number is 978. The whole packet contains more information; the figure shows only the information that's pertinent to this troubleshooting task. Both EtherPeek and NetMinder Ethernet can report decoded information in a format similar to this one.

Although it's not a rule, the first *tuple* (network description) usually contains the number of the network on which the router is broadcasting. In this case, the RTMP packet was collected on the Ethernet backbone, so that's the network described in the first tuple. The second tuple reports the number of the LocalTalk network on the other side of the router. Every router on the Ethernet backbone should have the same numbers for the first tuple (400-699;0) and unique values for the second tuple.

Now that you know how to read an RTMP packet, you should run a protocol analyzer on a Mac connected to your backbone network and collect RTMP packets from each of your routers. All routers broadcast RTMP packets every ten seconds, so the protocol analyzer can accomplish this task very quickly. Because the network carries many kinds of packets and there may be hundreds of packets in a ten-second period on a busy network, you should set the filters on your protocol analyzer to receive and process RTMP packets only.

The next part of this troubleshooting technique is fairly tedious. You must record the tuple information in each RTMP packet so that you can compare it with the tuple information coming from all the other routers on your network. For the purpose of comparison, I find it convenient to make a table of this data in a spreadsheet program. My table has a column for the Ethernet address, one column each for the AppleTalk network address and node number, and one column for each of the routing tuples. I can then sort the data by any column and find duplicates or oddballs.
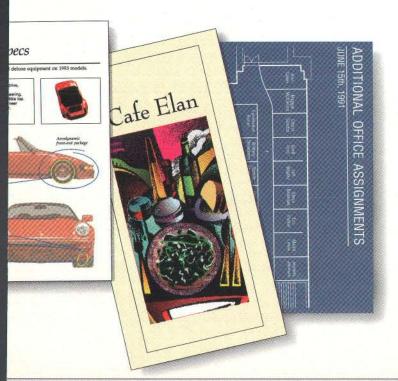
If you have a router with a configuration problem, you can find it in this type of table. Either the first tuple will be different from all the others, one of the other tuples will duplicate the network number of another router, or you'll see a network number that you don't recognize.

Once you've identified the router (or routers) that has bad network information, you can take it off-line, reconfigure it with the correct network numbers, and return it to action. Remember that it's important to take all misbehaving routers off the network at the same time so that when you restart them, they won't relearn the erroneous information.

Kurt VanderSluis is president of The Network Group, a training and consulting firm in Seattle.

About the time Steve Jobs was born, 3-D meant It Came from Outer Space *at the drive-in — not software for drawing goblets. Now you can stare through funny glasses at 3-D images on your Mac. StereoScopic-Mac!, a $20 shareware program by G. Vivarelli, includes several 3-D still lifes as well as instructions for making your own images. Available from Zmac and other shareware sources.*

By James Bradbury

PIM city: Personal Information Management (PIM) software is a natural for notebook-computer owners, and we've seen two new entries that look particularly, er, well appointed, with provisions for calendars, to-do lists, and name-and-address lists. Pastel Development's DayMaker ($99) wins the prize for slickest interface. It also allows customization through user-definable "views" that make it easy to filter out particular types of information. (212) 431-3421. ● Hyper-Card guru Danny Goodman used HyperCard 1.0 to create one of the first sophisticated Mac PIMs (Focal Point). Danny Goodman's Connections ($199), from Concentrix Technology, continues the tradition — it's a HyperCard 2.1 stack with all the usual PIM paraphernalia plus a nifty System 7-savvy "shared" calendar feature. (415) 358-8600.

The next best thing to being there: Mac users know The Voyager Co. for its innovative HyperCard/CD-ROM packages, which explore great works of classical music. But the company's primary business has been its catalog of classic films on videodisc. Now, a new offering combines both media. Mozart: The "Dissonant" Quartet is a HyperCard program on CD-ROM with an accompanying videodisc performance by the Angeles Quartet. So now you can *see* how hard it is to play that tricky bit in measure 42. $149.95. (310) 451-1383. ● Of course, the main point with Mozart is still what the music *sounds* like, and you can hear measure 42 on the new version of Bose's RoomMate Computer Monitor speakers ($339). They're similar to the company's earlier model but now come with a volume control and more connectors. (508) 879-7330.

Better grades through science: Word processors aren't the only software available to make a student's life easier. Next time a term paper's due, check out some of these: The entire series of Monarch Notes, which includes the plots of more than 200 great works of literature (more than enough for a four-year matriculation), can be yours on CD-ROM for $99 from the Bureau of Electronic Publishing. (201) 808-2700. ● If you'd rather read actual great literature, you can obtain the complete works of Shakespeare from Shakespeare on Disk for $350. (914) 266-5705.

Just for fun: After SimCity, the folks at Maxis thought really big and came up with SimEarth. Now they've thought really small and have created SimAnt. For $59.95, you can control the ultimate ant farm, complete with hungry spiders, competing ant colonies, and a hostile kid. Successfully colonize both the yard and the house, and you win the game. Finally — a program you can be glad didn't ship bug-free. (510) 254-9700. ▨

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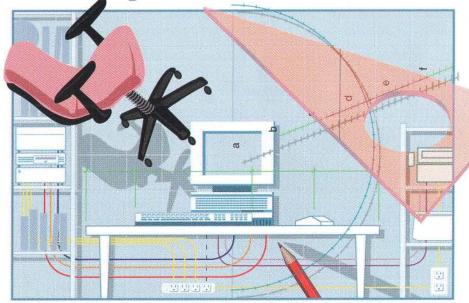
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Work Smart, Work Safe

Can a Mac waste your time? Only if you overlook the ergonomic realities of the Macintosh workplace.

By Steven Bobker

Productivity is the name of the game. It's why we all bought computers in the first place. And we chose the Mac over other kinds of computers because it does a better job of making us productive than the competition can.

When it comes to comfort, convenience, and safety, though, *where* and *how* you use your computer are as important as the design of the computer itself. You have little control over how Apple designs its CPUs, for instance. You can select a particular model, but you can't modify the ergonomic details very much. Your personal work space is a different story.

Users in large corporate settings may have more constraints than individual users with regard to factors such as lighting, seating, ventilation, and even what software they're allowed to put into their machines. But if you have the freedom to modify your work space and software configuration, it's worth the investment. And if you don't, you should protest: It's worth the bother.

You should be conscious of several potential productivity-robbing work-space problems. These vary widely in severity, in ease of avoidance, and in personal physical risk.

Sound Advice

The noise generated by drive motors and fans might seem merely annoying (which it certainly is), but in some cases, it can actually pose a health risk. Some computer users suffer ringing in the ears, or tintinnabulation, which is generally caused by ultrasonic noise in monitor power supplies. Early examples of the Apple 13-inch RGB monitor, the color monitor most commonly attached to Macs, were known for their loud fly-back transformers. Ringing in the ears can be incapacitating, and it persists even when the user is away from the computer.

To protect yourself against excessively noisy equipment, check user reports on Zmac and buy everything with a full written agreement that you can return it if it proves too noisy in your environment. Reputable peripheral dealers should allow returns within 30 days if their equipment doesn't meet your standards.

The only real cure for noise is isolation. Noisy printers and drives should be placed as far from your work space as is practical. You can buy soundproof enclosures from major office-equipment suppliers for dot-matrix printers and other noisy equipment. If you opt for a sound enclosure, be sure that it provides adequate ventilation for your equipment. You don't need expensive equipment to be quietly frying itself to death.

Glaring Deficiencies

Eyestrain is another frequent user complaint and productivity thief. It's usually caused by glare and inadequate overall light levels, which can also produce headaches. Glare has been covered extensively in MacUser Labs reports on monitors. If you must work in an area in which glare will be a problem, select monitors

PERSONAL BEST

that have antiglare coatings and treatments. Antiglare screens are available from Kensington, No-Rad, and others. They can be expensive and can cut contrast substantially, but they work wonders in high-glare environments. Some, such as No-Rad's, also protect you to some degree from the potential — but largely unproved — hazards of electromagnetic radiation.

Even more important than the coatings and screens are the placement and quality of your lighting. Avoid direct natural lighting on the screen. It's far too variable, and its extremes are hard to tame. If at all possible, avoid fluorescent lighting, particularly when the tubes are close to your screen. Fluorescent lights naturally flicker a bit. That's always bad.

The best indoor lighting is provided by halogen bulbs, which approach daylight in color and can be very bright. Their primary problems are cost (but that issue is fading rapidly) and heat (they are hot). Halogen fixtures should have shades and cooling vents and should be placed so that you can't see the bulbs. The first halogen bulbs required special fixtures, but you can now buy halogen retrofit bulbs that fit standard sockets. These are somewhat more expensive than top-quality ordinary bulbs, but they last longer and provide far-superior light. You can find them at good hardware and lighting stores, and they're sold through consumer catalogs such as Levenger and Brookstone.

Bad Vibes

An often overlooked irritant is the sapping effect of vibration. Mechanical devices such as hard drives, CD-ROM drives, and removable drives all vibrate to some degree. Put a stack of them on your desk, and your whole desk can start vibrating. The solution is usually simple. Put as many of the offending devices as possible onto a stand not connected to your desk. I stack my drives on a small bookcase near my work space. This arrangement allows good access to the tape and CD-ROM drives and causes no vibration problem. My entire cost was the price of one long (36-inch) SCSI cable — about $30.

If you do opt for a long cable, be sure to get a high-quality thick SCSI cable. These have each data line wrapped by a ground line (thin cables have only one ground around all 25 data wires) and soldered connections at each end. Because you can't rip each cable apart to see how well it's made, you must rely on the reports of

> **Work breaks should be substantial. Just stopping and daydreaming for a few minutes isn't enough.**

others. The best cables I've seen so far are made by Monster Cable, followed closely in quality by the cables sold by Apple, Microtech, and GCC.

Wrist Watch

Working at a keyboard for a long stretch can seriously damage your wrists and forearms. The problems are CTS (carpal-tunnel syndrome), in which the nerves in the wrist are damaged, and RSI (repetitive-stress injury), which affects the nerves, ligaments, and tendons of the wrist and forearm. Both conditions are very painful and can progress to a point at which work is no longer possible.

Unfortunately, CTS and RSI are rapidly becoming the most serious and rapidly spreading computer-user ailments. The main causes are poor design of keyboards and pointing devices and long, intense work sessions. Casual users have little to worry about, but if you spend even three or four hours a day at a keyboard, you should take precautions.

The mouse may not be an obvious culprit, but graphic artists and shoot-'em-up-game players have learned, to their dismay, that the mouse can bite. Trackballs stress the wrist far less and are a good alternative for those suffering from CTS and RSI.

The only cures for CTS and RSI are rest and a change of work habits. Braces help a lot — see your doctor for one. Icing the painful areas after work sessions also helps.

Avoiding CTS and RSI is relatively straightforward. Take frequent breaks. Get up, stretch, move about a bit. This is also good for your lower back. A program such as LifeGuard, from Visionary Software (Portland, Oregon), which periodically interrupts you and forces a break, is an excellent investment, at $59.95. Another way to remind yourself that you need a break is to set chimes to ring every 30 or 60 minutes, using the sound module of the ClickChange customizing program, from Dubl-Click (Chatsworth, California), or a scheduling program with an alarm. If you have an interesting or attention-getting sound, use it. If you have an LC or a IIsi, record yourself saying something such as "Time for a break!" In any case, do make

sure that you take regular breaks.

Work breaks should be substantial. Just stopping and daydreaming for a few minutes isn't enough. Walk around your chair if space is tight. Hand- and wrist-loosening exercises are important. Computer Comfort (a HyperCard stack and book by Computer Comfort, of Menlo Park, California) suggests some excellent exercises.

Get a good keyboard and a wrist support. Keyboards vary as widely in their ergonomic quality as they do in their key feel. The best keyboards (DataDesk's Mac 101 and Switchboard and Apple's Extended Keyboard II) have an adjustment that lets you change the angle of the keys by lifting or lowering the back of the unit. If your keyboard is not adjustable, it may well be too flat for comfortable work. Try a paperback under the back as a prop.

A long wrist pad that sits directly in front of the keyboard and keeps the axis of your wrists on a straight line when you're typing is an excellent (and cheap) investment. If you don't have such a pad, you'll tend to let your wrists drop, causing a curve in the main axis of your arm. This curvature is what strains the nerves and can eventually lead to CTS or RSI. The pads are available from virtually all mouse-pad manufacturers. Don't assume that the pad should be flush against the lower edge of the keyboard. That's too close for most users. The pad should be back far enough to support your wrist, which is about 1 to 1.5 inches back for most people.

One wrist pad isn't enough. You need wrist support when mousing as well as when typing. Maybe even more so. A whole second pad by your mouse is overkill. Either cut a full pad in half (and give half to a friend) or get a smaller pad. The Mouse Paw, from Marty's Computer Workshop, of Cambridge, Massachusetts, attaches to the mouse. It's a nice idea, but the units I've seen are too low and soft to be of any real value.

Most wrist pads have sharply cut edges and the slight give of high-density foam. Look for softer, rounded-edge pads. They conform better to your wrists.

Back Allies

Lower-back problems strike computer users regularly. The poor posture that is a direct cause of sore backs is caused by poorly designed chairs and desks. A good chair is as important as a reliable hard drive. The best chairs are not cheap, but they're worth every penny. In the lower price ranges, I've seen an excellent chair from ScanCo (Redmond, Washington). At the high end, BackSaver (Holliston, Massachusetts) makes a wonderful chair with adjustable head and lower-back supports. This chair can also lock into a forward-leaning position, so if you tend to lean forward (not a good idea, but a common work posture), you still get support.

Some people like the backless kneeling-style chairs. If you can get used to them, they force good posture and are surprisingly comfortable. The best is still made by the original manufacturer, Balans, of Norway.

Along with a good chair, you need a sturdy desk. The desk you work at should be solid, have ample room, and be at the right height. The optimum typing height is a bit lower than the optimum writing and reading height. For average people, these heights are around 25 and 29 inches, respectively. ScanCo makes desks with surfaces that can be angled and adjusted. They are excellent productivity tools.

Safety Counts

In addition to productivity and comfort matters, there's also safety to consider. Recently, there have been allegations of radiation danger from computer monitors. All cathode-ray-tube-based computer monitors produce some ELF (extremely low frequency) radiation as well as some better-known forms of electromagnetic radiation.

The claim has been made that ELF radiation is very dangerous. Although the bulk of the scientific literature fails to back up these claims, this doesn't guarantee that there's absolutely no danger. It's better to be safe than sorry, and it seems wise to maximize the distance between you and any monitors. On the other hand, the matter isn't worth getting panicked over. Several screens are alleged to cut radiation dangers. They may or may not do so. Distance is the best protection.

Your Mac isn't going to kill you, but it can hurt you, and in too many cases, along with your work space, it'll conspire to rob you of productivity. Luckily, common sense plus the techniques and products mentioned here will help you get more from your Mac with less effort on your part. What more could you ask for? 🖱

Steven Bobker runs Raw Fish Systems. He's been writing about Macs since 1985 and is at least as devoted as Apple is to low-end Macs and their users.

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How to Buy
Hard-Disk Drives

I f the only data-storage device you've got is a 40-megabyte internal hard-disk drive, it's time to go shopping for a larger drive — not only will data be a little less crowded but your Mac's performance may also improve. If you're in the market for more storage space (around 100 megabytes or so), here are some tips on getting the most megabytes for your buck. For specific product information, see the MacUser Labs reports on hard drives in the November '91, April '91, December '90, and February '90 issues.

By Victoria von Biel

? What's the difference between a hard *disk* and a hard *drive?* The disk is where your data resides; the drive is the entire unit.

✔ You can buy internal or external hard-disk drives. Because an internal drive is installed inside your Mac, it saves space on your desktop, but if it needs repairs, you may have to do without your Mac for a while. External hard drives can take up more desk space, but they'll work with every Mac and you can stack drives as your storage demands increase.

✔ Want an external drive that uses a minimum of desk space? Look for one with a "zero footprint" case — these slide right under your Classic-style (Classic, SE, SE/30, Plus) CPU.

✔ Yet another space-saving option (also great for PowerBook Macs) is the new generation of 2.5- and 3.5-inch wide 40- and 80-megabyte drives.

✔ Many vendors sell hard drives, but the mechanisms within these drives are produced by just a few manufacturers — and it's

the mechanism and driver software that determines the drive's performance. Check reviews in *MacUser* and other computer magazines to find the best drive mechanisms.

$ When comparing similar hard drives, divide each one's price by its capacity, to get a base dollar-per-megabyte price. Because many hard drives contain the same mechanism, a high price doesn't necessarily mean high quality.

? Make sure you know exactly what disk mechanism you're getting, and beware of "bargains" — sometimes vendors, rather than installing an advertised high-quality mechanism, substitute a lower-priced (and less reliable) one, perhaps from a company that has gone out of business.

$ Service and support are vital — reputable companies offer free phone support, quick turnaround on repairs, and loaner drives when yours needs servicing. Beware of vendors whose technical support consists of a 900-prefix telephone number — it can cost you a bundle.

$ Hard drives are often advertised in terms of their speed, but you don't necessarily need to get the fastest drive. If you have a Mac Classic, Plus, or SE, your Mac's SCSI circuitry limits the data-throughput speed, so the hard

drive's speed isn't that important. If, however, you'll be upgrading to a faster Mac in the future, it's worth spending the extra money to get a speedier hard drive.

✔ Because a hard drive is a SCSI device, you need to be able to set its SCSI ID easily. Look for external hard drives that let you do this with push buttons; stay away from DIP switches.

✔ Most drives have two SCSI ports, with a terminator in one port to be used if the drive is the last device on a SCSI chain. However, some drives now offer built-in "active termination," which automatically senses whether the drive is in the middle or at the end of the SCSI chain and sets the termination accordingly.

? Find out what formatting software is included with the hard drive. Some formatters offer just the basics, so you'll need to buy a third-party product to do such things as partition your drive or add password protection.

$ Looking for freebies? Some vendors include software such as disk-repair utilities, shareware, and virus checkers on their formatted drives at no extra cost.

✔ Check the drive's documentation. You should get a manual that includes information on SCSI issues *and* tells you how to use the formatting software.

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With System 7, Apple lets you add almost anything — applications, documents, folders, you name it — to the Apple menu, but it neglected to provide an easy way to organize it all. Now there's HAM ($99), from Microseeds, which not only lets you add submenus to items on the Apple menu but also lets you arrange those items in any order, automatically add frequently used files and folders, and reopen windows on restarting. (813) 882-8635.

By John Rizzo

Storage savers: Running out of disk space? SpaceMaker, from Aladdin (the StuffIt Deluxe people), does on-the-fly compression that is truly transparent. Drag a file into a special folder; it compresses. Drag it out; it decompresses. You can also set SpaceMaker to compress disks, folders, or individual files when you're not using your Mac. SpaceMaker is bundled with version 3.0 of StuffIt Deluxe, and you can buy it separately for $59.95. (408) 761-6200. ▲ On the other hand, you can deal with a crowded hard disk the old-fashioned way: Buy a bigger hard disk. The 911-megabyte N900i ($4,599), from Microtech, is the biggest internal 3.5-inch drive you can buy and is good news if you own an SE/30, IIcx, or IIci, none of which can hold a 5.25-inch drive. The N900i (like Microtech's other Nova-series drives) is health-conscious: It's bundled with Norton Utilities to keep the drive fit, and to help power users avoid carpal-tunnel syndrome, headaches, and fatigue, it includes Visionary Software's LifeGuard DA, which periodically reminds you to take a break from your Mac. (203) 468-6223.

SyQuest's successor: Thinking about buying a SyQuest drive? You may want to think again. A group of Japanese, U.S., and European manufacturers spent last summer plotting to overthrow the reigning removable-media monarch. Sony, IBM, Panasonic, and more than a dozen other big guns met to hammer out their differences and ensure that all drive mechanisms are compatible. The replacement standard? The new generation of 3.5-inch optical drives that use 128-megabyte floppy-disk-sized cartridges that are impervious to magnetic fields — unlike SyQuest cartridges. Sony, Optical Access, and CMS are among the first to offer such drives for the Mac, with prices ranging from $1,600 to $2,000 (compared with $800 to $1,500 for 88-megabyte SyQuest drives). Can SyQuest stand up to the Gang of 20? Rumor has it that the company is working on a 2.5-inch magnetic version of its current drive . . . .

Multimedia alternatives: Now that multimedia features are beginning to appear in business software, you don't have to be a master of MacroMind Director to add glitz to your presentations. Case in point: Virtus Vision ($695), with its Interactive module ($200), is a 3-D modeler and virtual-reality environment with near-photo-realistic rendering that lets you add video, animation, and sound to your creations. Activate the multimedia effects by clicking on any 3-D object on the screen — Vision contains Apple-event links to HyperCard and QuickTime. (919) 467-9700. ▲ Don't be deterred by its name — Serius Programmer ($295) lets even the most nontechie user create homegrown applications that include multimedia effects. You "build" an application by connecting graphic elements and use Serius' AppEvent Object module ($49) to connect it to QuickTime for video and animation. (801) 272-7788. 🖳

The Back of the Mac

If the back of your Mac reminds you of the dark side of the moon (only dustier), this guide will tell you what all those plugs, cables, and doohickeys are for.

By Andy Ihnatko

D o you know what all those ports on the back of your Mac are for? You should. Many Macs have been damaged by people who've tried to stick something where it didn't belong. An infamous example is the former PC owner who "recognized" his new Mac's SCSI port as the familiar IBM printer port, plugged in his printer, and fried his Mac to the tune of $400.

All of the Mac's cables are designed to plug in to a port one particular way. Round connectors, such as ADB (Apple Desktop Bus) and serial cables, sometimes have an arrow stamped on the connector to assist you; the arrow is supposed to face up as you look over the top of the Mac. It's easy to see how DB (data bus) connectors, such as video and SCSI connectors, should fit, but double-check just to be safe. If you try hard enough, it's possible to force the connector into the port upside down, leading to an unhappy trip to your friendly local service technician.

The figure below shows a IIsi; your Mac may not have all the ports shown.

Security Ports

Anticipating the Mac's popularity, Apple put in these security ports, which are receptacles through which a set of metal brackets (available from Apple) can be inserted but not withdrawn, letting you chain your investment to the desk. It's not foolproof by any means, but it can keep foul miscreants from lifting your Mac and toting it away.

Sound-Input Port

Apple would like everyone to believe that this port (found on the LC, IIsi, PowerBook 140 and 170, and Quadra 700 and 900) lets users connect a microphone for annotating spreadsheets and reports verbally, which will lead to sickeningly high productivity. More likely you'll use it to put the latest "Saturday Night Live" catchphrase into your HyperCard stacks. It's just a standard eighth-inch audio jack that accepts any microphone (with an eighth-inch plug) or mono input from any audio source, such as a CD player or tape deck.

Sound-Output Port

When you find it on a radio, it's called an earphone jack. On a computer, it's known as a sound-output port. Sheesh. After hearing a sound-intensive game such as Crystal Quest through the Mac's built-in speakers, you know you can do better (although both Quadras have pretty impressive speakers). Plug your home stereo system or even a cheap little speaker into this jack, and you'll appreciate how nice the Mac can sound. All Macs have a standard eighth-inch jack, and Mac II and Quadra owners can enjoy stereo sound. (That's *can,* not *will* — as yet, only a few specialty applications support stereo sound output.)

Serial Ports

The serial ports are a pair of mini-8 jacks (DB-9s on the Mac 512K and 128K); one is used for hooking up a modem, and the other is for a printer (the PowerBook 100 has only one serial port). They're more or less standard serial ports (RS-422 instead of the more common RS-232C).

Modem Port. This port has one or two features that make it slightly more suitable than the printer port for telecommunications, but there's no reason why you can't plug a second (non-networked) printer into the modem port.

Printer Port. This port doubles as a LocalTalk port, which connects your Mac to a LocalTalk network of printers and file servers. You can *try* connecting a LocalTalk network box to the modem port, but it won't work. Trust me.

SCSI Port

Using the SCSI port is the fastest way to get data in and out of your Mac. It's used to connect peripherals — hard drives, scanners, Ethernet boxes, and the like — that need to communicate fast, fast, fast. But don't mistake the SCSI port, which uses a DB-25 connector, for a serial port — the surest way to fry a Mac is to connect a non-SCSI device to the SCSI port. If you have more than one SCSI device, don't worry — you can daisy-chain as many as seven devices to your Mac. Most SCSI peripherals have their own SCSI ports, so you can plug a hard drive in to the Mac, a scanner in to the hard drive, a CD-ROM drive in to the scanner, and so on.

Video Port

On Macs with built-in video (the IIci, IIsi, LC, and Quadra), any Apple monitor can be plugged in to this port, which accepts a DB-15 connector. (If your Mac lacks built-in video, you need to install a NuBus card or, in the case of the SE and SE/30, a processor-direct card.) Once the monitor's plugged in, the Mac automatically figures out what kind of screen it is and sets itself accordingly. *Some* non-Apple monitors can also work, but only if the screen has been designed to mimic a genuine Apple display. Check with the manufacturer before you buy; otherwise you need to install a special card that works with that particular monitor.

Floppy-Disk-Drive Port

This port accepts a DB-19 connector for hooking up an external floppy drive. It's found on all Macs except the II, IIx, IIfx, PowerBook 140 and 170, and Quadras. Those of you with 100-megabyte hard drives, don't snicker — that drive is going to crash someday, and when it does, you'll wish you had that 1.44 megabytes of storage! This port is compatible with the 1.44-megabyte SuperDrive and the standard 800K drive. If you have a Plus or older Mac SE, you need to buy upgrades or add-ons to use the SuperDrive, but cheer up — *you* can use external 400K drives without modification!

ADB Port

The IIsi, Classic, LC, PowerBooks, and Quadra 900 each have one of these mini-4 connectors, and all other models have two. All ADB ports are the same: They let you connect input devices such as keyboards, mice, graphics tablets, and trackballs to the Mac. The number of ADB ports on your machine doesn't matter much, because like SCSI devices, ADB devices can be daisy-chained — one device plugs in to the back of another.

Quadra Ethernet Port

The Quadra 700 and 900 both have something extra: A port that lets you hook directly in to an Ethernet network. The only other device with built-in Ethernet is the new, high-resolution LaserWriter IIg.

PowerBook SCSI Port

This port (officially known as the HDI-30 port) works the same way as any other SCSI port; it just looks a little different (it's the square port on the right in the photo above). It accepts a square 30-pin connector instead of the standard DB-25 connector. One cool thing about the SCSI port on the PowerBook 100 is that if you plug a special 29-pin connector (with the catchy name HDI-30 SCSI Disk Adapter) in to the SCSI port and connect it to another Mac, the PowerBook appears on the other Mac's desktop as a volume.

PowerBook 100 Floppy-Disk-Drive Port

To keep the PowerBook 100's size small, Apple made the Power-Book's floppy-disk-drive port a little smaller: It accepts a square 20-pin connector (HDI-20) instead of a DB-19, but otherwise it works the same way as a standard floppy-disk-drive port. It's the square port on the left in the photo above.

Although contributing editor Andy Ihnatko has blown up many computers in his day, he'd like to point out that none of them were his.

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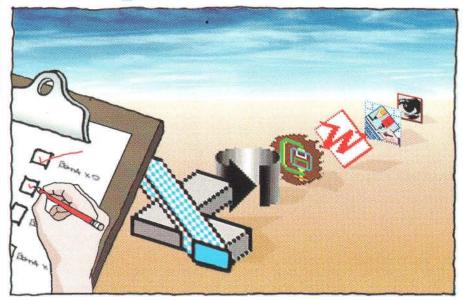
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Getting Compatible

If the Compatibility Checker, which shipped with System 7, scared you into sticking with System 6, relax — things aren't as bad as they look.

By Bob LeVitus

ast month I said a lot of nice things about Apple's System 7 Personal Upgrade Kit. I still firmly believe that System 7 is Apple's best product in a long time, but I didn't get around to warning you about the one piece of questionable software the kit contains — the Compatibility Checker.

In his August '91 column ("Compatibility Checkmate," page 23), *MacUser* editor Jon Zilber said that CC had reported that 20 of his applications were compatible, 50 needed upgrades, and 100 were incompatible and that it had never heard of the remaining 500. My experience was about the same — according to CC, less than 3 percent of my software has a clean bill of health. The only problem is that I happen to know that least 90 percent of my software works fine with System 7, and chances are pretty good that 90 percent (or more) of *your* software will work fine too. But because not many people are aware of CC's fallibility, thousands of potential users may have been discouraged from enjoying the best system software Apple has ever released even though most of those people could upgrade without any major problems.

CC is a great idea, but its execution was botched. To its credit, Apple is scrambling to fix things: CC 1.1, with almost 250 new entries and updated information on about 300 others, is now available. And to make CC even more user-friendly, its terminology has been updated as well.

Unfortunately, these changes are too little,

too late. First of all, many users think that CC actually *checks* for compatibility. It doesn't. CC is just a HyperCard stack that compares the contents of your hard-disk drive with a database of prerecorded information. Apple should emphasize that CC does not actually *look* at a program and actively determine whether it's compatible or not. Second, Apple should make it clearer that not everything CC flags is really incompatible. Finally, Apple should include step-by-step instructions on how to test for compatibility manually.

Because Apple has done none of this, I hereby submit my own method for checking compatibility.

Dr. Mac's Compatibility Recipe

The first ingredient is to back up the contents of your hard disk. That way, in the unlikely event that disaster strikes, you can easily restore your disk to its pre-System 7 state. Next, launch the Before You Install System 7 stack, click on the Compatibility Checker button, and then click on Start Checking. When CC has finished, you may get a dialog box that says, "Attention: Potential Problems With System Folder Items." If you get this message, click on the Move Items button. This creates a new folder called May Not Work with System 7, and any potentially incompatible INITs or cdevs (known as extensions and control panels under System 7) are moved from the System Folder into this new folder.

You'll now see a compatibility report on-

screen that you can print, save, or throw away. Don't panic when you look at the report and see that most of your programs are incompatible or — more likely — that information isn't available for these products. Remember, CC is nothing more

than a database of information and all the information was submitted by third-party developers and wasn't verified by Apple — and it's months old by the time you see it. Even if you have version 1.1 or 1.2 of the Compatibility Checker, the information

may be inaccurate or out-of-date. In other words, take everything it tells you with a grain of salt.

No matter what CC says, go ahead and install System 7. Now you're ready to really begin testing your software for compatibility with the new system.

The Compatibility Test

There are two things you can do about the items in the May Not Work With System 7 folder. The safest is to call the developers and ask if System 7-compatible upgrades are available (the CC report includes phone numbers for many of your programs' publishers). I recommend that you do this first, but if you're bound and determined to check each program yourself, drag one item (let's call it program A) from the May Not Work With System 7 folder onto the icon of your System Folder. You'll probably see a message asking permission to put the item into the Extensions or the Control Panels folder. Click on OK, and then restart your Mac.

If your Mac crashes or hangs before you see the desktop, you know that program A is incompatible. Restart your Mac while holding down the Shift key to disable all INITs and control panels. Open the System Folder, find program A, and drag it into the Trash. *Now* call the developer and find out if an upgrade is available.

If you *don't* crash on startup, you're still not out of the woods. If program A is a control panel, play around with it a little. If it has buttons, click on them. If it has a dialog box, try everything in it. If it doesn't crash, chances are it's OK. If it's an INIT, check to see that it's doing what it's supposed to do and then use it for a couple of days. If you don't have any problems, it's probably fine.

After you've repeated this procedure for each program in the May Not Work With System 7 folder, the hard part is over — but you still have to examine your applications.

Start by launching the apps that are listed as "Mostly compatible," "Must upgrade," or "Not available" in the CC report. If an application crashes when you launch it, it's almost certainly incompatible. Call the publisher, and ask about an upgrade. If it *doesn't* crash right away, you'll need to test it further. Try all the menu items. Resize the windows. Call up dialog boxes. Save. Quit. Launch it again. If you can do all these things without incurring an error message or freezing your machine, there's a pretty good chance you're dealing with a

program that works fine under System 7.

One last thing: Most incompatibilities have to do with virtual memory or 32-bit addressing (32-bit mode makes 32-bit software run faster). If you keep these options turned off, many of the incompatible programs will work just fine. If you do use either of these features and you find an incompatible program, test it again with virtual memory and/or 32-bit addressing turned off. If you read your CC report carefully, you'll see that some applications have the initials AD or VM in the Notes column. AD means that the item doesn't work with 32-bit addressing; VM means that it doesn't work with virtual memory.

Better Checkers

I've recently had the opportunity to use a prerelease copy of Help!, from Teknosys ([813] 620-3494), a diagnostic program that checks your entire setup against an extensive "knowledgebase," alerts you to any problems, and tells you how to fix them. It's like Apple's Compatibility Checker on steroids. One of its best features is the ability to simulate how your System 6 software and hardware will work under System 7, so if you're still shaky about trusting the Apple CC — even with my recipe — Help! may be just what you're looking for.

Help! is an application written specifically to provide technical support and information about your computing environment. It uses an expert system to compare your environment with a built-in knowledgebase of information, which includes rules for detecting problems as well as recommendations for solving them. To make sure this information is up-to-date, Teknosys offers a subscription service that guarantees at least four knowledgebase upgrades per year plus upgrades to the product itself.
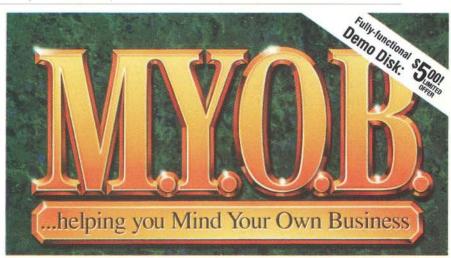
The application couldn't be easier to use. Just launch it, click on the New Profile button, and wait a few minutes. After it has examined your system, you'll receive a well-organized and extremely comprehensive report (mine ran to 18 pages) that covers your Mac and all mounted disks.

Help! can detect INIT and control-panel conflicts; incompatibilities between your system software and hardware; conflicts between applications and system software (including much-more-detailed information than the Compatibility Checker provides); and improperly installed files, duplicate files, multiple System Folders,

insufficient memory, and damaged files.

You also get a detailed report on your configuration — installed RAM; ROM version; SCSI devices connected; expansion cards installed; and complete lists of your INITs, control panels, fonts, and

applications. This is excellent information to have handy if you ever need to call a software publisher for technical support.

Another program you may find useful — especially if you use a lot of INITs and control panels — is INITInfo Professional,

BEATING THE SYSTEM

The System 7 File: More Smart Alias Tricks

In the continuing saga of *MacUser* alias tools comes our final (we promise) alias-creation utility — ZMakeAlias, available exclusively on Zmac. ZMakeAlias adds a Make Alias check box to the standard Save dialog box so that you don't have to leave an application and go to the Finder to create an alias. You can save the alias to such areas as the Control Panel or Apple Menu Items folders. ZMakeAlias was created by programmer Mike Throckmorton, of Ann Arbor, Michigan. It's available in Library 3 (Utilities) of the MacUser Forum or Library 3 of Zmac's Download & Support Forum; the filename is ZMAKEA.SIT.

While we're on the subject of aliases, I'm still finding cool things to do with them. For example, it's convenient to have a folder full of aliases for all your applications, but finding all your programs and creating aliases one at a time is too much work. So try this tip, submitted via CompuServe by reader Morgan Driscoll: Create a new folder on the desktop, and name it Application Aliases. Now use the Find command in the More Choices mode to find files with the following identifiers: kind, contains, and application (be sure to check the All at Once check box in the Find dialog box). When all the files have been selected, choose Make Alias from the File menu, and voilà — you've just created aliases for all your applications. Now move the still-selected aliases to the Application Aliases folder.

Submit your favorite System 7 tip, either by mail to *MacUser* or by modem to Zmac's System 7 Forum. If you submit the month's best tip, you'll not only receive notoriety and fame but you'll also get a spiffy (and rare!) "I Beat the System" T-shirt.

from Baseline Publishing ([901] 682-9676). It's a HyperCard stack full of detailed information about INIT and control-panel conflicts under System 7.

Keeping in Tune

Once you've installed System 7 and figured out which programs are incompatible, your troubles are over forever, right? Not so fast. As you use your computer, new problems can and will arise. New INITs and control panels can affect your Mac's performance, and hard disks develop problems of all shapes and sizes on an alarmingly regular basis.

First and foremost, back up your data. Good backup habits are the only insurance against disaster. Also, remember that one backup is never enough. It's a good idea to have two or more backup sets and, if possible, store one of them off-site (for more on how to back up your data, see "The Best Backup Strategies," October '91, page 206).

For those who don't already own a backup program, I recommend either Redux, from Microseeds ([813] 882-8635), or Retrospect, from Dantz Development ([415] 849-0293), both of which are now compatible with System 7. If you back up to floppy disks, Redux is as good as it gets; if you back up to anything else — another hard-disk drive, SyQuest cartridges, or tape — check out Retrospect.

Beyond backups, I know of several products that help keep your Mac and hard disk healthy. Perhaps the most intriguing is MacEKG, from Micromat Computer Systems ([415] 898-6227), a control panel

that monitors your system's floating-point-unit, QuickDraw, and SCSI-I/O performance on an ongoing basis. The first time you use it, it records all of your Mac's performance characteristics and stores this information as a benchmark called Maiden Launch. Then, at user-specified intervals — every startup, once a day, once a week — it reevaluates your Mac's performance, compares it with your Maiden Launch information, and notifies you if system performance declines.

Two other programs — Disk First Aid and Norton Utilities for the Macintosh — keep your disks in tip-top shape. Disk First Aid, a freebie that comes with Apple system software, detects and repairs several kinds of disk damage. I recommend running it every month or two, even if your hard disk seems to be working fine.

Norton Utilities for the Macintosh, from Symantec ([408] 253-9600), is a more comprehensive set of tools for repairing crashed disks, recovering files, and optimizing hard disks. In addition to diagnosing and repairing more than 45 of the most common and dangerous disk errors, NUM can recover trashed files and restore data you've accidentally erased.

Call me paranoid, but I use all these products regularly and have done so since I installed System 7. Maybe it's luck, maybe it's coincidence, but since I began this regimen, I've had no major problems with my Mac or my hard disks. ⌘

Bob LeVitus is the author of the soon-to-be-released second edition of *Dr. Macintosh* as well as the just-released *Marvelous Macintosh Games*.

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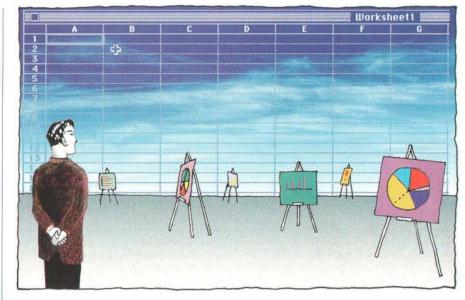
Graphic Details

Depending on their quality — and relevance — graphs and charts can make or break your presentation. Here's how to design graphs that say all the right things to your audience.

By Thom Hogan

A few months ago, I described some guidelines for building spreadsheets (see "Designing the Perfect Spreadsheet," August '91, page 255). This month I'll do the same for graphs and charts. After all, once you have those numbers nicely arranged in your spreadsheet, you need to have some way of presenting them, right?

Graphs are a lot like statistics: You can make them say just about anything you want. Done poorly, a chart tells the audience nothing; done correctly, a chart based on the very same numbers can tell a compelling and interesting story that the audience understands with just a glance.

Give It a Name

I'm always amazed when I see untitled graphs that give the readers no context for interpreting their information. If you're going to all the trouble of showing them a graph or chart, you should tell them what you think it means. And I don't mean putting a paragraph of 9-point type at the bottom of the graph. If you want to see how graph titles should be done, check out *BusinessWeek* magazine, which does things such as run three graphs side by side, the first entitled "Hot Sales . . . ," the second "Equals Hot Growth . . . ," and the third "But Poor Margins." The titles alone tell you what the graphs should look like.

Just make sure, however, that the graph supports the title's idea. This is one area where *BusinessWeek* is less than perfect: Despite its

wonderful graph titles, when I look closely at the actual numbers, I don't always think that the title is accurate. Sometimes this is because the magazine tries to boil the concepts illustrated in the graph down to as few words as possible, sometimes it's because of slight fudging or exaggeration of the data, and sometimes the title just misses the point. For example, a graph called "Fast Growth" shouldn't be mostly horizontal — it should look like a rocket's trajectory into space. Moreover, if the graph is supposed to show three years of modest growth followed by three years of dramatic growth, "Fast Growth" is not an appropriate title — "Growth Spurt" is a better description. When I see such a graph, my first question is "What happened in the year that growth went from modest to dramatic?"

Don't Fudge

It's easy to make graphs look exactly the way you want with today's sophisticated programs. Be careful, however, because you may be making your graphs say something you don't mean, or — worse still — you may find yourself misleading your audience.

A gimmick I hate is the axis that doesn't start from 0. Let's say that a company's sales for the past three years were 100, 101, and 102 units. If you graph this properly, with a continuous scale from 0, you get a rather flat graph. If you graph this series with an axis, starting say, from 100, you get a very different graph, one with dramatic upward growth. If a graph entitled

"Dramatic Growth" has a measurement axis that doesn't start at 0 or is discontinuous, the dramatic upward slant may match the title, but it may not reflect the actual numbers.

A related error is when two side-by-side graphs have different axis scales. If you're comparing companies A and B, both companies' figures should be graphed in a consistent manner that compares similar data. For example, if you want to compare two companies' growth rates, simply charting each one's overall sales is not the answer — what you really need to graph are the actual growth rates as a *percentage* of overall sales.

There are many ways to fudge the numbers in a graph and make things look different than they really are. Sharp graph readers know all the shady tricks and immediately check out any chart for such anomalies. If you're interested in learning more about the proper presentation of data in chart and graph form, check out Edward Tufte's *The Visual Display of Quantitative Information* (Cheshire, Connecticut: Graphics Press, 1983), Bruce Robertson's *How To Draw Charts & Diagrams* (Cincinnati: North Light Books, 1988), or Nigel Holmes' *The Designer's Guide to Creating Charts and Diagrams* (New York: Watson-Guptill Publications, 1984).

Simple Is Best

I'm always amused when a company trots out a newfangled charting program with 496 ways to display 3-D, bas-relief bar charts. When I create charts or graphs, I use Excel's standard bar chart more than 90 percent of the time (although I note that Microsoft has succumbed to the 3-D trend in Excel 3.0). The problem with 3-D graphs is that they're difficult to read and interpret and generally don't mean very much, although they may be very attractive. *PC Magazine* has been running such graphs for as long as I can remember, and I've yet to learn one piece of useful information from any of them. On the other hand, the graph style makes me believe that the staff of *PC Magazine* actually uses computers to capture and generate results — I can't imagine a graphic artist sitting down at a drawing board and trying to build such charts.

More often than not with 3-D charts, you'll create ambiguous results. If you use proper perspective in a 3-D chart, for example, bars look bigger the nearer the front of the chart they are. Because of this, it's possible in a series of bars to make some values look larger than others, even though the underlying numbers are the same. The only time I use 3-D charts is when dealing with volume; consult the books I mentioned earlier for other appropriate situations.

Keep the Correct Time

It's funny how conventions are set up only to be flouted over and over again. In the Western world, we've come to expect that the horizontal axis in a chart refers to the passing of time. If you have a line graph where time is a factor and the line goes from left to right, the bottom axis must be time, right? Well, it should be, but it isn't always, because most spreadsheet and graphing programs let you do all kinds of weird and unusual things such as making the *vertical* axis represent time.

A related problem is creating charts that *imply* a time value when they don't have anything to do with time. Let's say you're charting the relative quantities of beer, water, and vinegar consumed in 1990. You could put beer, water, and vinegar labels at the bottom of the chart and represent the values with tall vertical bars, but that would be wrong. When readers see this, they're automatically going to try to interpret the chart with some sort of time element ("Gee, are sales going up over time? Nope, that doesn't look right . . . "). The correct way to relay this information is to have the horizontal axis represent quantity; put beer, water, and vinegar along the vertical axis; and have three horizontal bars representing values.

Use the Right Chart

There are an incredible number of charts at your disposal: line charts, flowcharts, tree charts, area charts, pie charts, unit charts, picture bars, maps, and many more. Each chart type tells a different story. In the beer, water, and vinegar example, a pie chart might have been a better choice than a bar graph. Then again, it might not have been. A pie chart indicates completeness — the things being graphed should represent *all* of a category, not just some parts. So if beer, water, and vinegar were the only liquids sold that year, a pie chart would be appropriate. However, if the title is "Three Hot-Selling Liquids," then a horizontal bar chart is the better choice.
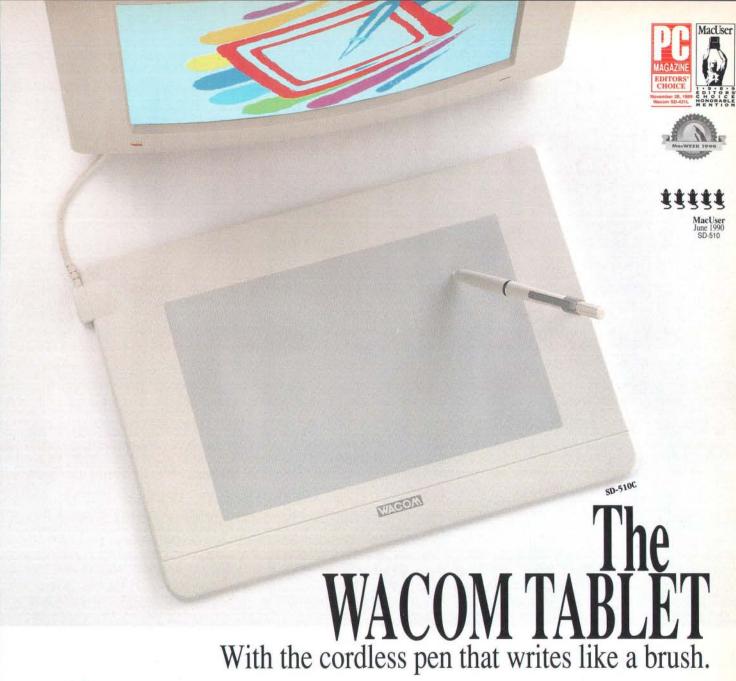
How do you know which chart is right for your data? Even the books I recommended hardly begin to cover this subject, so I won't attempt it here. But just knowing that each kind of chart or graph has an appropriate use should start you thinking about which one you should use. First, look at graphs that other people have done that deal with the same concept you're trying to illustrate (such as sales growth or market share). What kinds of charts have they used? Did one type seem to do a better job than the others? Then put yourself in your readers' position, and ask yourself how you think they'll interpret the chart.

Carefully consider the data you're plotting *before* designing your chart, and ask yourself how useful it is. For example, many people think that most time-based dollar charts display meaningless data. Think about it: If you plot your salary for the past ten years and the line goes upward, does that really mean what it looks like? Because the value of a dollar in 1991 is not the same as it was in 1981, you're doing the graphing equivalent of comparing apples and oranges. Of course, you could factor in inflation and plot your data in constant dollars; unfortunately, depending on your situation, the inflation factor cited by the government might very well be a meaningless statistic in itself. The Consumer Price Index, for example, comprises a "standard" bundle of goods and services that may not reflect what you purchase. It might be more relevant to graph how many days you have to work each year to purchase a useful and constant item, such as a side of beef or one month's rent. The data points in this case are meaningful, and the graph you've created can be said to represent a real statistic.

Famous Last Words

This is my final column for *MacUser* — indeed, it's the last time I'll be writing about computers in the foreseeable future. I'd like to thank those readers who sent comments and letters over the past couple of years. And for those of you who weren't paying attention, here's some advice: The computer is a tool, a means to an end. You can have fun reaching that end, but you shouldn't get too caught up in the computer companies' hoopla and marketing noise. If a tool isn't going to work for you, either stop using it or don't buy it in the first place. You're not a word-processing weenie just because you use the original version of MacWrite. Nor are you a spreadsheet power user just because you have both Excel 3.0 and WingZ installed on your hard disk.

Thom Hogan is an evangelist at GO Corp., creators of the PenPoint operating system.

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Balloon Help Takes Off

Once you know the ins and outs of the Help Manager, it's not that hard to add your own help balloons to System 7-compatible applications.

By Kurt W. G. Matthies

System 7's Help Manager is one of the easiest ways for developers to add value to their applications as well as for users to customize their favorite programs. Its most noticeable feature is Balloon Help, named after the comic-book-style balloons that display information. In case you still haven't seen them, these balloons provide context-sensitive help for an application, popping up as you position the cursor over objects on the screen. If you know some of the technical details, you can add balloons to any System 7-compatible application, using either a resource editor such as ResEdit or, more easily, a new utility from Apple called BalloonWriter. (Needless to say, because Balloon Help is a System 7-exclusive feature, the balloons appear only when you're running the new system software.)

Balloon Basics

To turn on Balloon Help, select Show Balloons from System 7's Help menu, which appears in the upper right corner of the menu bar. Apple has included hundreds of help balloons — describing such things as the action of each of the Finder's menu items, dialog boxes, and icons — with the System 7 Finder. Other parts of the system software, including the Open and Save As dialog boxes, also have built-in balloons, and most new or upgraded applications support Balloon Help. Not only do balloons add value to an application but they're also relatively easy to incorporate. In most cases, adding Balloon Help messages

requires no additional coding, so many developers use underpaid writers (as opposed to overpaid programmers) to add Balloon Help to commercial applications.

Here's how Balloon Help works: As you move the cursor within a predefined screen rectangle, called the *hot rectangle*, a balloon containing a message about that area appears. When the cursor leaves the hot rectangle, the balloon disappears. If you have a sharp eye, you'll notice that balloons don't appear immediately but only after the cursor has stopped for a certain length of time. This delay keeps balloons from popping up all over the place as you move the cursor across the screen. Apple says this delay is about one-tenth of a second; unfortunately, this value is built in to the system software, so neither programmers nor users can change it.

A balloon appears as a rounded rectangle with a pointer. This pointer, called the *tip*, points to the item of interest and can appear near any of the balloon's four corners. The programmer specifies where the tip should be, and the Help Manager is responsible for selecting one of the eight possible balloon positions so the help message is clearly visible on-screen.

Although balloons can display either text or graphics, text balloons are much more common and are easier to implement. Apple has definite ideas about how help text should read, so I thought I'd pass those ideas on to you. First, because a balloon shouldn't be too large — especially if it's to appear on a Mac Classic

screen — use clear, concise phrases. Second, use active sentence constructions, stating the goal first. For example, the balloon for the Cancel button of the standard File dialog box reads, "To close the dialog box without opening the document, click here," not "Click here to close the dialog box without opening the document." Finally, Apple advises you to avoid technical jargon, suggesting instead that you follow the style and usage standardized by — who else — Apple. If you're interested in the official Apple writing style, read the *Apple Publications Style Guide,* available for $30 from APDA (Apple Programmer's and Developer's Association). You can contact APDA at (408) 562-3910.

A note for application developers about writing help strings: The Macintosh has earned a reputation around the world as a computer whose software can be easily modified to fit different languages (a process known as *localization*). Help strings should therefore be kept in resources, so that localizers in other countries can access and translate them. The simplest form of text resource is the string list resource, or STR#. By definition, these strings are limited to 255 characters — extra incentive for you to write clear and concise help messages.
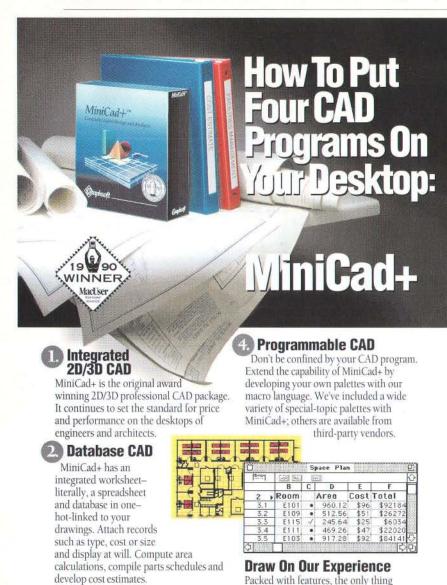
Building Balloons

The Help Manager is structured so that you can associate balloons with three kinds of objects in an application: menus and menu items, dialog-box items, and arbitrary window rectangles. Accordingly, there are three kinds of resource formats to support these balloons—hmnu, hdlg, and hwin. There's also a companion resource, hrct, for hwin that describes the window's hot rectangles. To add balloons to an application, you create these resources along with the corresponding string resources that hold the help messages.

Adding Balloons to Menus. By using a resource editor such as Apple's ResEdit to create an hmnu resource, you can add help balloons to an application's menu bar.

Balloon Printer

Most people keep help balloons onscreen for just a moment to jog their memory about how a particular tool or function operates. Sometimes, however, you need a more permanent reminder. Balloon Printer, developed for *MacUser* by Kurt Matthies, is an Fkey that lets you use the key combination Command-Shift-8 to print the currently active balloon. You can get your own copy of Balloon Printer from Zmac. It's in Library 3 (Utilities) of the MacUser Forum or Library 3 (INITs, cdevs, FKEYS) of the Download & Support Forum; the filename is BALPRT.SIT. If you'd like to see how Kurt wrote Balloon Printer, you can check that out on Zmac too. Source code for Balloon Printer is available from Library 9 (Source Code) of the Download & Support Forum; the filename is BALCOD.SIT.

Apple's homegrown utility BalloonWriter can help both developers *and* users create Balloon Help text.

This resource lets you associate a balloon with a menu's title or with any of its items. For each menu item, you have the option of associating one balloon with its enabled menu state and another with its disabled state. Likewise, you can associate another message with a menu item when it's checked and yet another message with a menu item that's marked with something other than a check, such as a diamond or bullet. You can even specify a balloon for what Apple calls a "missing" menu item, or one that's added dynamically to the menu. An example of such an item is on Microsoft Word's Window menu: As you open a document in Word, the document's name appears on the Window menu.

The hmnu resource doesn't require that you specify a hot rectangle for the balloon. Instead, the Help Manager uses the menu-item rectangle as the balloon's hot rectangle. When the cursor is in that rectangle, the balloon appears.

By the way, the hmnu resource works only if your application uses the standard menu-definition (MDEF) procedure to draw its menus. If you're adding balloons to your own application, then you know whether you've written an MDEF procedure for it. But if you're customizing an off-the-shelf application, you may not know if it uses the standard MDEF or not. One way of finding out is to use ResEdit to see if the target application has an MDEF procedure. If you know how to use ResEdit (the current version is 2.1.1), you'll find this a simple procedure. For those who'd rather not use ResEdit, the simplest way to detect a custom MDEF is by looking at how the application's menus behave. A nonstandard menu, for example, may have graphical menus or menus that list Command-Shift or Option-key keyboard shortcuts (for some reason, Command-key shortcuts are considered standard menu behavior). If the application uses a nonstandard MDEF, you can't add Balloon Help to menu items simply by adding hmnu resources — you'll have to add these balloons through programming.

Adding Balloons to Dialog Boxes. To add help balloons to an application dialog box or alert, you must create an hdlg

POWER TOOLS
POWER PROGRAMMING

For developers who want more control over help resources, Resorcerer is an excellent tool for adding help balloons to applications.

resource and a corresponding hwin resource. The dialog box must have an associated DITL (dependent item list) resource, which almost all dialog boxes have (for more on DITL resources, see "Let's Get Lost," September '90, page 329). You can define help messages for any item in a dialog box as well as for any condition the item may be in (for example, you can have one message for a check box that's marked and another message for an unmarked check box).

The hwin resource is vital, because the Help Manager uses it to find the help messages for a particular window (dialog boxes count as windows too). The hwin resource in turn points to the hdlg resource for the dialog box. The hdlg resource contains information about those items in the dialog box that have associated help messages.

Adding Balloons to Arbitrary Window Rectangles. The Help Manager uses the item rectangle that bounds the item (read from the DITL resource) as the balloon's hot rectangle. However, if the dialog box is configured so that the help balloon either doesn't fit on the screen or obscures the item it's pointing to, Apple offers an *alternate hot rectangle,* which lets you specify where the balloon will be triggered. The alternate rectangle resides in the hdlg resource. (Set this resource to 0,0,0,0 if you want the Help Manager to use the default item rectangle as the hot rectangle.)

The Help Manager also uses a default location — a point 10 pixels down and 10 pixels to the right of the upper left corner of the hot rectangle — to place the balloon's tip. If you don't like this location, you can use the tip-offset value in the hdlg resource to specify an alternative location for the balloon's tip (if you want the default location, keep this resource's value at 0,0).

The Easy Way

If I've lost you with all this discussion of resources and alternate rectangles, take heart: You don't have to memorize the resource formats if you use Apple's

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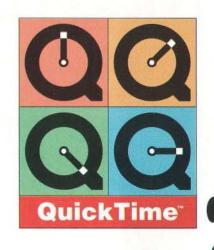
Works is powerful, easy to learn and marvelously affordable. And if you get it now, we'll give you a copy of new Quicken® 3.0 — the leading personal finance package — free. For more information, call (800) 426-9400.

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POWER PROGRAMMING

Figure 1: Using BalloonWriter, from Apple, is the easy way to add help balloons to your System 7-compatible application. The back dialog box shows how BalloonWriter automatically creates the appropriate resources for every menu and dialog box in the target application. Once that's been done, you add the text that will appear in each balloon, as in the front dialog box.

homegrown utility BalloonWriter, a tool that can help both developers *and* users create Balloon Help text for applications. Although it was in beta version when I looked at it, the final version of BalloonWriter should be available from APDA for less than $50 by the time you read this. It's also available as part of APDA's E•T•O (Essentials, Tools, Objects) CD-ROM, which costs $300 for a one-year subscription.

To use BalloonWriter, you must be running either System 6.0.7 with MultiFinder or System 7 and you must install the BalloonWriter INIT in your System Folder. Once you've installed it, you perform the following six steps to add balloons to an application:

1. Open BalloonWriter, and select New from the File menu to create a new balloon-data file.

2. Select Attach to Application from the Balloon menu. Choose your target application in the resulting dialog box.

3. Select Create Standard Balloons from the Balloon menu. BalloonWriter will read the target application's resource fork and create hmnu and hdlg resources for every menu and dialog box in the target application. This can take some time, depending on the application's size.

4. Double-click on each help item in BalloonWriter's main dialog box, and type the help text in the resulting dialog box (see Figure 1). Keep your help text concise! At this point, you can also fix the alternate rectangles and balloon tips, if you want to.
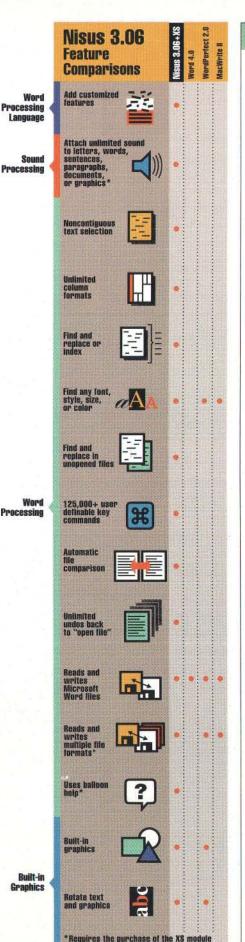
5. Select Install Balloons from the Balloon menu, and name the output file in the resulting dialog box. BalloonWriter will create a copy of the target application, complete with the new help resources installed. Before quitting BalloonWriter, select Save from BalloonWriter's File menu to save the balloon-data file.

6. Open the application, and test it with the Help Manager by turning on Balloon Help and seeing if your new balloons appear.

BalloonWriter is easy to use, but it's limited in what it can do. For developers who require more control over help resources, an excellent tool for adding Balloon Help to your target application is the resource editor Resorcerer, from Mathemæsthetics ([617] 738-8803), which has templates that work with Balloon Help. Note, however, that the process is not automatic, as it is in BalloonWriter. You have to know how the resources interact to create the balloons.

Balloon Help is covered in detail in *Inside Macintosh, Volume VI* (Reading, Massachusetts: Addison-Wesley, 1991). Not only does this volume cover the Help Manager but it also gives inside information on all the other new System 7 features — such as outline fonts, publish-and-subscribe, and color icons — you'll need to know about to make your applications 100-percent System 7-savvy.

Kurt Matthies is president of Macreations Publishing, of Boulder, Colorado, which publishes Tycho TableMaker.

Do you have an undocumented Macintosh tip you're willing to share? MacUser pays $25 for every tip used, and the Tip of the Month earns $100.

✉ Send your tip, together with your name, address, and phone number, to Tip Sheet, c/o MacUser, 950 Tower Lane, 18th Floor, Foster City, CA 94404.

You can also contribute tips electronically via Zmac, the on-line service for Mac-User. Send them to Gregory Wasson at 72511,36. Be sure to include your full name and mailing address along with the text of the tip.

**Compiled by
Gregory Wasson**

Excel 3.0

Excel 3.0's drawing tools make Excel a fairly decent drawing environment for simple business graphics such as flowcharts (see Figure 1). You can make this feature even better by setting up a grid similar to those found in most drawing programs. To do this, select the entire worksheet and use the Format menu to set the row height to 12 and the column width to 1. Hold down the Control or Command key as you draw with one of Excel's drawing tools, and the object will automatically align to the grid. Experiment with the row-height and column-width settings to come up with a variety of grid sizes.

K. MacFarlane
Santa Cruz, CA

QuarkXPress

Because numerals are generally designed as monospaced characters, even in proportionally spaced fonts, they don't look as if they line up flush left with smaller type above and below — there's usually too much white space to the left of the numeral. Unfortunately, in QuarkXPress you can't kern to the left of the first letter in a line unless the first character is a space. If you have a numeral as the first character in a line, insert a space before it — you can then kern the space between it and the second character, lining up the numeral with the text above and below it.

Geoff Latta
New York, NY

FileMaker Pro

When you insert a record of two or more words (for example, a company name) into a field, press Option-space rather than just space between words when you first enter the text for that field.

Then when you need to know the exact wording of that entry while in another record (for example, if you want to insert the company
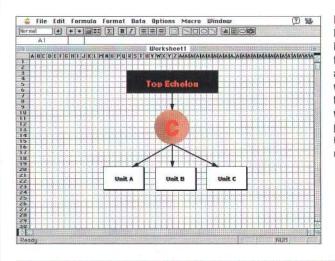
Figure 1: If you're using Excel 3.0 to draw simple business graphics such as flowcharts, you can create a grid to which objects will align by adjusting the worksheet's column width and row height and pressing the Control or Command key as you draw.

Tip of the Month

MicroPhone

MicroPhone comes with a settings file for CompuServe that adds a button to the icon bar. When you click on it, the button brings up a scrollable list of CompuServe locations you can select and to which you can navigate. The problem? There are probably a lot of places on the list that you'll never want to visit. Here's how to edit it:

Open the CompuServe Folder in your MicroPhone folder, and double-click on the file named Places to Go. This is a TeachText document that contains paired items — the first line of every pair is a descriptive phrase that appears in the scrollable list within MicroPhone, and the second line is the CompuServe "quick word" that lets you use the Go command to navigate within the service (see Figure A). To customize the list, simply delete the unwanted pairs and save the document as text only.

K. McCord
Capitola, CA

Figure A: To avoid having to scroll through a long list of CompuServe forums you never visit, edit the file called Places to Go in MicroPhone's CompuServe Folder.

name into another record), you can press Command-I to access a dialog box that lists the values for that field in all the records in the database. Entries that use the Option-space keystroke will be listed with all the text on one line rather than with the words listed alphabetically. You can then select the multiword entry and click on the Paste button to insert the entry into a new record or a record you want to modify.

Stefani Stefano
Modena, Italy

PageMaker 4.0

The Table Editor that comes with PageMaker 4.0 works well, but once a table has been imported into PageMaker, text within a cell can't be reformatted. Here's how to solve this problem:

1. Create a table in the Table Editor as usual, and copy it to the Clipboard.

2. Paste it into a graphics program that accepts PICT graphics.

3. Select the text, and format it as needed.

4. Select the table, copy it, and then paste it back into PageMaker.

The table's lines and shading can be modified in the graphics program in the same way.

Ward Barnett
Minnetonka, MN

Word

Sometimes while using Word, I accidentally discover new key combinations without knowing exactly what function they serve. Here's a quick way to find out the action of any key sequence:

1. Choose Commands from the Word Edit menu.

2. Pick any command from the list on the left, and click on the Add button in the Keys section of the dialog box.

3. Word will ask you to type a key sequence for the command you've chosen. Type the key sequence that performed the unknown action, and you'll get another dialog box telling you what command this key sequence is now assigned to. No more mystery, but be sure to click on Cancel to prevent reassignment of the key.

Jim C. Martin
Redmond, WA

Christopher Hvid's July '91 tip on automating index entries in Word 4.0 (page 229) is fine if you don't mind fooling around with RTF files, but here's a much easier technique that you can use for indexing all occurrences of a word.
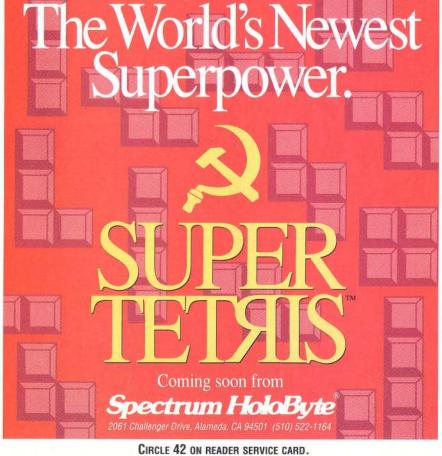
Start by manually indexing the first occurrence, using Insert Index Entry, on the Document menu. Then select the word (make sure you include the index characters that appear at the beginning and end of the word), and copy it to the Clipboard. In the Change dialog box (Command-H), type the word you want to index in the Find What field and type ^c in the Change To field (^c represents the Clipboard contents). Replace all nonindexed occurrences of the word by clicking on either the Change or the Change All button.

I use this method frequently — the pasted text retains all formatting, and you can avoid using the cumbersome RTF format.

Rick Sonntag
Media, PA

System 6

In his August '91 Beating the System column ("System 7.0's Hidden Secrets," page 249), Bob LeVitus states that "under System 6.x you can't begin a filename or folder name with a space . . . ."

Although Bob is correct in saying that System 6 doesn't allow you to type a space character as the first character of a file/folder name, it doesn't test to see if the *second* character is blank if you try to delete the first.

Therefore, if you want to add a space to the beginning of a filename or folder name under System 6, here's a sneaky way to do it: Type a character followed by a space at the beginning of the name. To get rid of the initial character, simply press the left-arrow key, the Delete key, and then Return —

and there you have it.
Chris Severtson
West Des Moines, IA

System 7

Here's a System 7 secret that no one needs to know but that's fun to try. Open the Control Panels folder, and then open the Monitors control panel. Click on the 7.0 in the upper right-hand corner of that window, and you'll see the names of the programmers who worked on this part of System 7. Then, while holding down the mouse button, press the Option key. You'll see the happy face move its eyes and stick its tongue out. If you press the Option key several more times while continuing to hold down the mouse button, you'll see the names change.
Dave Santo
Pomona, CA

To zap the parameter RAM (PRAM) under System 6, hold down Shift-Option-Command while selecting the Control Panel on the Apple menu.

Under System 7, hold down the Option, Command, P, and R keys when starting up.
Sterling Ledet
Powder Springs, GA

Tips from the Experts

MORE 3.0
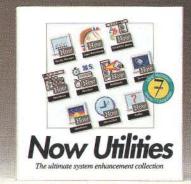
For those who want to know more about MORE, Symantec has supplied a couple of power-user tips:

Previewing. If you use a Mac Plus, SE, or Classic to create presentations, you can use the Edit menu's Print Options feature to view large outlines and presentations at 100-percent magnification without having to zoom out, adjust location, and then zoom back in again. While in Print Preview mode, magnify the document to 100 percent by clicking on the document preview and then hold down the Command key. A hand icon will appear at the cursor location; use this tool to move the document around within the window (make sure you keep holding down the Command key while moving the document).

Moving Among Objects. When working with several objects on a bullet chart, you don't have to use the mouse to move among objects. Repeatedly pressing the Tab key cycles through similar objects (for example, all text objects) within such a chart.

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Questions, anyone? Here's where to get answers from the experts. Bob LeVitus is the author of the best-selling Dr. Macintosh. *Andy Ihnatko isn't. But he knows a lot about the Mac, and he's got a heck of an attitude. Together, they're ready to answer your questions about everything Macintosh.*

✉ *Write to Help Folder, c/o MacUser, 950 Tower Lane, 18th Floor, Foster City, CA 94404.*

Don't want to wait for an answer? Post your question on Zmac, MacUser's on-line service, and get a reply from Bob, Andy, or one of the other MacUser experts. See the masthead in this issue for instructions on how to sign up.

By Bob LeVitus and Andy Ihnatko

ROM Upgrades Coming?

Q. Now that Apple has released System 7 and new machines with 32-bit-clean ROMs (IIci, IIfx, IIsi, LC, Quadra, PowerBook 140 and 170, and Classic II), when are we going to see ROM upgrades for the SE/30 and the IIcx?

If such upgrades are in the works, how much do you think they'll cost? I have 8 megabytes of RAM installed in my IIcx and would like to take advantage of the higher-density 4-megabyte SIMMs now available. With a ROM upgrade, will my RAM limit be 32 megabytes, or 128 megabytes, or what?

Ken O'Shea

Heidelberg, Germany

Bob: At press time, Apple had no plans for a ROM upgrade. That's rather interesting, as the product sheet for the SE/30 claims that its RAM is ". . . expandable to 128 megabytes when SIMMs with higher-density DRAM chips become available" and the IIcx sheet says, ". . . expandable to 32 megabytes of RAM when denser chips become available." Apple absolves itself by saying (in fine print), "Product specifications are subject to change without notice" on the product sheets.

But don't despair — there is a solution in the form of MODE32 from Connectix, which Apple is now distributing without charge. MODE32 is a control panel that lets Mac IIs, IIx's, IIcx's, and SE/30s run in 32-bit mode under System 7. Without MODE32, these Macs are limited to 8 megabytes of executable physical memory and virtual memory cannot exceed 14 megabytes; with MODE32, your Mac IIx, IIcx, or SE/30 can address up to 128 megabytes of contiguous physical memory and up to 1 gigabyte of virtual memory (a Mac II can address up to 68 megabytes of memory and 1 gigabyte of virtual memory).

You can get a copy of MODE32 by downloading it from an on-line service such as AppleLink, America Online, or CompuServe, or contact your user group or local Mac dealer. And if you already own MODE32, Apple will refund the purchase price. Just send your original MODE32 disks to Apple Computer, Inc., Attn: MODE32 Refund Program, 20525 Mariani Avenue, M/S 73P, Cupertino, CA 95014; (800) 776-2333. If you live outside the U.S., contact your local Apple business office. By the way, don't bother getting MODE32 if you have a Mac Plus, Classic, SE, or Portable, because these machines can't benefit from it.

If you have one of the 24-bit Mac II models (II, IIx, or IIcx), you can purchase a logic-board upgrade from Apple, but it's expensive.

If you have a II or a IIx, you can upgrade it to a IIfx for around $2,500. You'll need to purchase new RAM for the IIfx, as its SIMMS are slightly different from those of the II or IIx.

If you have a IIcx, you can upgrade it to a IIci for around $1,500. The IIcx can use 100-nanosecond or faster RAM; the IIci requires 80-nanosecond or faster RAM, so you may need to buy speedier RAM chips, depending on what you have installed in your IIcx.

If you have an SE/30, you're out of luck — no Apple logic-board upgrade is available.

Yen for Chicago

Q. I've recently read several articles about ResEdit, but very few of them get specific about using the program to solve common problems. For example, I want to substitute the symbol on the Mac keyboard's Command key

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✳ . . . But Were Afraid to Ask

According to legend, when a student asks a Tibetan holy man, "What's the Meaning of Life?" he simply answers, "Mooooooo," signifying, "You have just asked a question so unbelievably dopey that it doesn't even deserve an intelligent response."

Here at Help Folder, we would never do that. We think of all questions as golden doorways that lead to boundless new dungeons of information. So keep the queries coming — and to protect you from the scorn of Tibetan holy men, we'll change your name to that of someone single-handedly responsible for the Red Sox losing a World Series at one time or another.

Q. Why does my color monitor's screen flicker whenever I eat potato chips? It's usually steady as a rock.

Bob Stanley
Pitcher, Red Sox, 1986

Andy: The actual truth is that when you crunch down on those chips, your teeth create a shock wave that causes your eyeballs to jerk up and down a bit, enabling you to witness the magic of the modern cathode-ray tube in operation.

See, a CRT's image is "painted" onto the screen by an electron beam that swerves from left to right across the screen, from top to bottom. You can observe this yourself by conducting the following Mr. Wizard-type experiment: Tilt your head down so you're looking straight at your keyboard. Move your eyes up as far toward the ceiling as they'll go, and then snap your head up. While your head's in motion, the image you see on-screen will be almost twice as tall as usual, because the image is being painted across a field of vision that's twice as long as usual. Likewise, if you snap your head down, the image will be half as tall.

When you chow down on chips, your eyes are jerking all over the place, making the image longer in some places and shorter in others, resulting in flicker. The effect is even better with Fritos — they're much crunchier and do a great job of shaking the eyeballs.
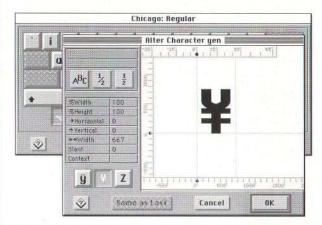
Figure 1: If you want to create custom characters in a font but don't want to mess around with ResEdit, a utility such as FontMonger can make the process virtually painless.

for the totally useless (to me) yen symbol (¥). I opened the Font resource of a copy of Chicago 12, drew the symbol, and found that ¥ remained unchanged, even as I edited the bit-map on the left side of the screen. Is there a method I can use to change this particular symbol?

Fred Pollak
Whitestone, NY

Andy: Unfortunately, no. You've hit upon a little bit of Macintosh trivia here: The Chicago 12 font is the only font that's actually burned right in to the Macintosh's ROMs. It makes sense — after all, it's the default font for menus and title bars and all kinds of other cool stuff. Whenever the System needs Chicago 12, it ignores any disk files and just gets the bit maps from ROM. What I'm getting at is that you'll have a more productive time nailing Jell-O to a wall, so you might want to try modifying another font.

Bob: If you're using System 7, which includes a TrueType version of Chicago (it's a bit-mapped font in earlier System versions), then I have a solution for you. It's FontMonger, from Ares Software ([415]578-9090, $99.95), a handy utility that lets you modify characters in TrueType and/or PostScript fonts (see Figure 1). Plus, you

can convert fonts from Post-Script to TrueType (or vice versa) quickly and easily. With a street price of around $70, it's a real bargain.

Mission: Partition

Q. Some hard-disk-formatting utilities boast a feature that allows them to create partitions on a hard disk. I've heard that doing this can help enhance a hard disk's performance. So just what the hey *is* a partition? Is it really useful?

Robert Lopas
Alexandria, VA

Andy: A partitioner is a special kind of hard-disk-formatting program that lets you set up multiple volumes on one hard disk. Don't know the difference between a disk and a volume? Imagine that all of your 1991 issues of *MacUser* are in an attractive slipcase. The slipcase containing all those magazines is the disk, and each individual magazine is a volume on that disk. Each volume can exist and function separately from the others: You can mount the December issue — that is, pull it out, plop it onto your desk, and read it — while all the other volumes remain in the slipcase.

When you run the installation program that came with your new 105-megabyte hard drive, it creates a single 105-

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MacUser
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SAM 3.0 halts viruses *before* they infect your system and operates invisibly in the background—interrupting you only when a virus is detected. New SAM 3.0 even repairs infected desktop files automatically, no questions asked.
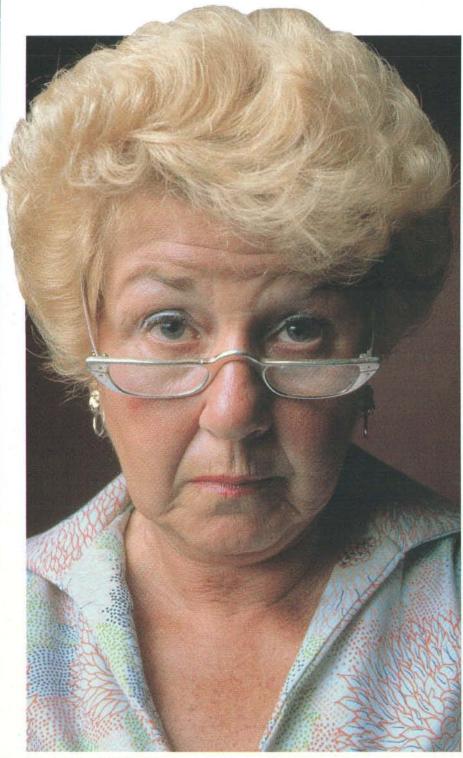
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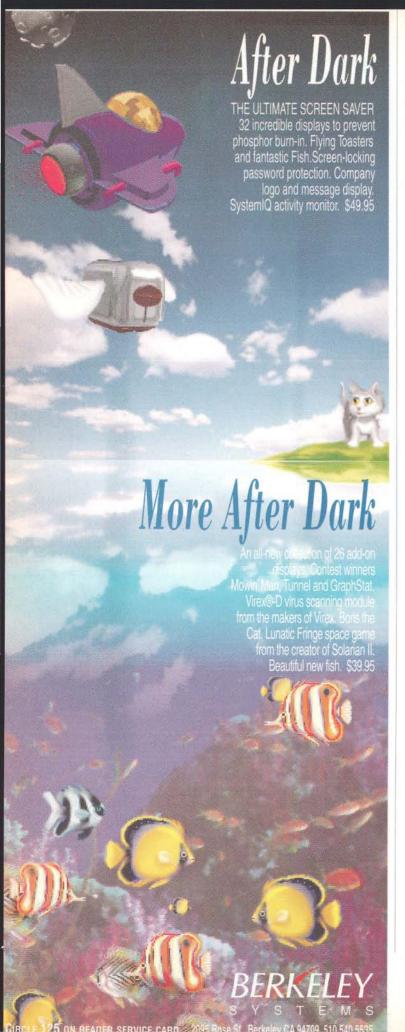
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megabyte volume — a slipcase containing only one big book. A hard-disk partitioning program can take that 105 megabytes of storage space and chop it into several volumes. For instance, I've partitioned my own hard disk into five volumes, each of which appears on the desktop as a separate icon, as if I had five hard drives plugged in to my SCSI port.

Unfortunately, there aren't any partitioning programs in the public domain. If you bought a good hard drive, the formatting and installation software that shipped with it can probably create partitions as well. If you bought a semi-lousy drive, you'll have to buy a commercial partitioning utility. My fave is Silverlining, from La Cie ([503] 691-0771, $149), a complete set of hard-disk utilities that can format, test, and partition just about any hard disk in this sector of the galaxy.

The actual partition-creating process varies among programs, but generally it's as simple as specifying the sizes and names of the partitions you want to create. Figure 2 shows how Silverlining handles it. As you can see, very little bloodshed is involved.

And now on to the philosophical question: Why partition? Partitioning a big hard disk into several smaller volumes can noticeably reduce the time it takes your Mac to locate a file, especially under System 6. Each Macintosh volume contains a directory of all the files contained therein, so obviously the Mac can locate a file on a 10-megabyte partition much faster than it can on an unpartitioned 105-megabyte volume.

Another advantage is that having several volumes makes it easier to organize your data. Of my five partitions, only one contains critical files for which no commercial master disk exists, so when I back up my hard disk, I can zero in on that volume and save lots of time.

Most partitioning programs also let you control which partitions automatically mount (appear on the desktop) when you start up your Macintosh. If your kids habitually drag your company reports to the Trash just to see and hear Oscar the Grouch sing (a common complaint, I'll have you know), you can create your own partition. If, at shutdown, you tell your Macintosh that your partition is *not* to be mounted at startup, then your kids will never know that it even exists. For extra security, some partitioners let you assign passwords.

Two caveats: First, most partitioning software doesn't allow you to create or resize partitions without reinitializing the whole disk first (destroying any and all data already there), so you may have to invest some time in backing up your hard disk before the magic of partitioning can take place (but you're already doing this regularly, right?). Second, you need to make sure the partitioning program creates *true* SCSI partitions. Fake, or "soft," partitions require that you install an INIT before you can mount and access the partitions, so they aren't nearly as convenient.

Disks That Won't Format

Q. Is there a way to use Norton Utilities for the Macintosh to diagnose a disk that won't format? I have several 1.4-megabyte floppies that I've used to back up data. After three or four months, each one has given me a disk-error message. I try to reformat them but to no avail — the disks appear to format, but on verification, my SE spits the disk back out. I can't find any way for the Mac to hold onto the disk long enough for me to use Norton Utilities on it.

Randy Miller
Sherman Oaks, CA

Figure 2: Partitioning your hard-disk drive makes backing up easier and lets you password-protect crucial files. The actual process varies among programs, but generally it's as simple as specifying the sizes and names of the partitions you want to create. The partitions above were created with the formatting program Silverlining.

Bob: When I get errors writing to a disk or a disk that won't format, I immediately throw the disk into the garbage. Why tempt fate? Floppy disks are relatively inexpensive these days, so if a disk won't initial-ize or if it displays errors when you use it, the safest action is to toss it.

If you're bound and deter-mined to use the disk, try launching Norton Utilities' Disk Doctor (or Apple's Disk First Aid) before you insert the disk. Most disk-recovery pro-grams allow you to work on a disk that can't be used in the Finder, if you launch them before inserting the disk.

By the way, some brands of floppy disks have a replace-ment warranty — if the disk fails, the company will replace it for free. It's too much trouble for me, but if you're so in-clined, shop for brands that offer this guarantee.

How Loud Is Too Loud?

Q. I'm concerned about my external hard-disk drive. When I turn it off, it makes a rattling noise while the platter is spin-ning down. The sound comes from inside the case and doesn't depend on the drive's orienta-tion. Should I complain to the manufacturer?

Robert Erck
Lombard, IL

Andy: With a hard drive, it's not so much *what* noise it makes; it's *when* it makes the noise that's significant. Rat-tling noises at startup or shut-

down are usually nothing to worry about. Here's why. The very first thing a hard-drive mechanism does when it's powered up is to make sure that its read/write arm is accurately positioned at the outermost edge of the drive's platters (the stack of disks where your data is stored). Hence the noise. You may hear the same sort of noise at shutdown — this time the hard-drive controller is making sure the arm is in its "parked" position, safely away from the platter.

More serious are any nasty, cat-in-a-blender type of noises the drive may make during the hours between startup and shutdown. My own hard drive, peculiarly enough, started making a constant screeching noise after I had to make a both-feet-on-the-brakes panic stop at 70 miles per hour and

the drive (which was sitting on the passenger's seat) flew into the dashboard. So if you hear really nasty noises from your hard drive — anything worse than a whir and an occasional blick-blick-blick—take it back to the dealer (or stop taking it with you in the car).

Cache-ing In

Q. I do a lot of DTP work on a Mac SE with 2.5 megabytes of RAM. What's the difference between RAM and the RAM cache? How big should I make my RAM cache? And finally, how big should the ATM cache be? My RAM cache is now set at 768K; the ATM cache is set at 288K.

Martha R. Ward
Sulphur, LA

Bob: Unfortunately, this question is a little more complicated than it needs to be, and

it's all a question of terminology. What you're referring to as RAM cache is actually correctly referred to as disk cache (I know, Apple calls it RAM cache under System 6, but that's wrong and Apple has fixed this in System 7). The difference between RAM (random-access memory) and a disk cache is that RAM is the total amount of memory installed in your Macintosh (2.5 megabytes, in your case) and a disk cache is a portion of this memory set aside for frequently accessed disk data. Because data can be read from RAM far faster than from disk, a disk cache can make your Macintosh appear to be running faster. The RAM cache, on the other hand, is the card in the Macintosh IIci that holds frequently used RAM data (for example, when an application loads,

some operations are loaded into RAM and others remain on-disk).
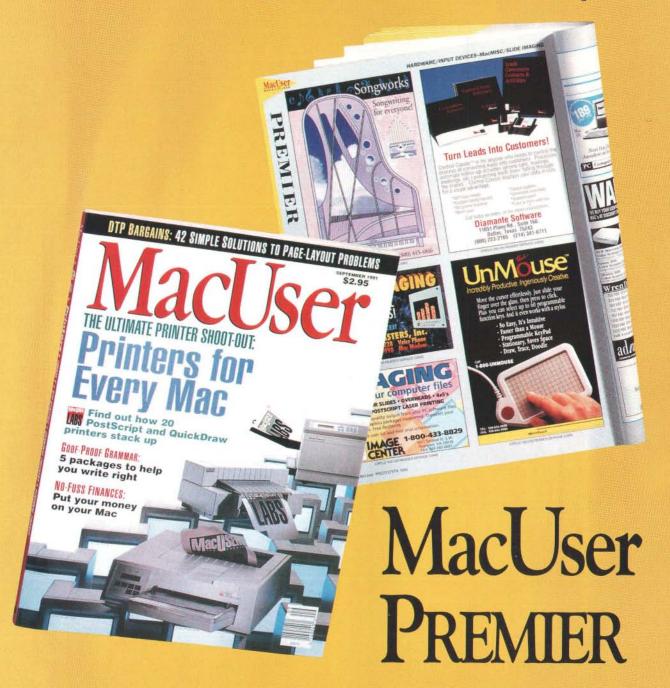
I always recommend using trial and error to discover the lowest cache setting you find useful. Both of your caches are set too high. Memory used for the cache is not available for other programs, so you may be using up precious RAM. I'd be surprised if you could even get programs such as Page-Maker to run with so little RAM left over.

Try setting your Mac's disk cache (it's in the Memory control panel under System 7) to 128K and the ATM cache to 196K, and restart your Macintosh. Use these settings for a while. If things seem to run quickly enough, try slightly lower settings; if things seem sluggish, try slightly higher ones. 🖱

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Will Rogers never met a man he didn't like. John C. Dvorak never metaphor he did.

The intuitive user interface is around us all. The Mac has been claiming to be intuitive from day 1. Then Microsoft jumps on the intuitive bandwagon with Windows, and suddenly everybody is selling software and computers that are so obvious that any imbecile can understand them — intuitively. My own intuition says bull.

I long ago discarded the notion that the user interface of any computer was intuitive. I believe that nothing is intuitive and that everything is learned.

Anyone who has taken a rudimentary course in cultural anthropology knows that if you discover a tribe of primitive people and introduce anything from Western civilization to them, their reactions will be completely alien. I've always been amused by the anecdotes about showing films to African primitives. The tribespeople watching the screen would wonder where the people went as they walked "off the screen." Were they vanishing into a void? Did they somehow trick the audience by hiding behind the screen? When a scene changed, the natives would be startled, wondering what had happened to the previous "world." Curiously, the original intention of showing films to the Africans was to find out how they'd react to particular stories in the films — not how they would react to the medium of film itself.

If there is a hidden message here, it's that we sometimes take interface issues for granted. No one ever considered that the metaphor of film, which we take for granted, would itself end up being the issue of dispute and the center of attention.

Intuition Hike

So what is intuitive? Even something as supposedly easy as using a mouse must be learned, and a lot of people have trouble learning it. I love to tell the story about how a secretary of mine was waving the mouse in the air, wondering why the cursor wasn't moving.

Most of us recall the scene in *Star Trek IV* where Scotty is confronted by a Macintosh. First he talks at it, thinking that the computer can hear. An engineer motions toward the mouse. Scotty sees the mouse and knowingly picks it up and talks into *it* as though it were a microphone. This scene epitomizes the truth about intuitive user interfaces — there's no such thing!

One CompuServe user, Vince Kellen, proposed a contest: "Instead of looking for that powerful (and complex) user interface, I propose that we solicit readers for the Top Ten most intuitive interfaces of all time (and all worlds). I propose the following: (a) the toilet seat, (b) the up/down on/off light switch, and (c) the garden rake."

These were all rejected by other readers, for a variety of reasons, and the contest idea went nowhere fast. Nobody could come up with a universal intuitive interface. Ben Sano suggested that we look at any two-year-old. "The best user interfaces are things you can pound with, such as hammers; things you can throw, such as rocks; and things you can smear, such as mud. Now that's intuitive."

Playpen-Based Computing

The playpen interface: hammers, projectiles, mud. You know what to do with them. You can know nothing else. Sano might be right. It's possible that once we've gone beyond these three playpen activities, everything is learned and nothing is intuitive. When confronted with a computer, most two-year-olds pound on it to hear the clacking noise.

When it comes to computers, the concept of an intuitive interface is pure malarkey designed to sucker the unwary. Complicated and powerful software is going to require that users actually learn how to use it. The problem is that the Mac has forced programmers to use certain conventions that support the "correct" interface. This is mostly because it's easier to use these conventions than to do something different or something better. This forced common user interface is cloaked in the sheepskin of intuitiveness.

But isn't it possible that in being constricted by these newly created bogus intuitive commonalities, we are exposing ourselves to the same kind of rigid world views that entrapped the African tribespeople? Man has excelled when change, challenge, and novelty are thematic. These things are not thematic with either the Mac or Windows, both of which have rigidified the interface. "Conform or die" is their theme.

The graphical user interface, the pull-down menus, the mouse, and the rigid interface so popular today will be the great hindrance to progress in the decade ahead. Let's give up on this intuitive nonsense (and the common interface used to exploit the notion) while we still can.